C-Bus™ Multi Room Audio

C-Bus™ Products Training Course

Training Guide

1250SM0907R10/09

Retain for future use.

Schneider Electric

HAZARD CATEGORIES AND SPECIAL SYMBOLS

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

Danger indicates an immediately hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Warning indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠ CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

CAUTION

Caution, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage or improper operation.

NOTE: Provides additional information to clarify or simplify a procedure.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. This document is not intended as an instruction manual for untrained persons. No responsibility is assumed by Square D for any consequences arising out of the use of this manual.

FCC CLASS B

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this device that are not expressly approved by Schneider Electric could void the user's authority to operate this equipment.

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SAFETY PRECAUTIONS

This section contains important safety precautions that must be followed before attempting to install or maintain electrical equipment. Carefully read and follow the safety precautions below.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must be installed and serviced by qualified electrical personnel.
- Turn off all electrical power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm that power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

Multi Room Audio Matrix Switcher

V1.0 Dec 2005

Contents

1.0   Description

The Multi Room Audio (MRA) Matrix Switcher is the heart of a C-Bus enabled audio distribution system. Used in conjunction with Multi Room Audio Amplifiers, the Matrix Switcher accepts inputs from several audio sources and distributes them to up to eight zones. Each zone (equipped with one or more Amplifiers) has control over which source it receives.

Two mono audio inputs are provided to broadcast messages to all zones simultaneously. These can be used with audio sources such as a door bell, intercom or public address system.

Audio distribution is performed via digital connection to maintain audio quality. Amplifiers may be located up to 45 metres from the Matrix Switcher. C-Bus switches are used in each zone to select the source and adjust the volume, bass and treble.

The Matrix Switcher is installed in a room together with audio sources such as a radio tuner, CD player and digital TV set top box. Connections are made to the Amplifiers and to C-Bus.

2.0   Important Notes

·   The Matrix Switcher is suitable for operation in moderate to tropical climates. It should be mounted indoors only.

·   Use only the supplied power cord to connect the unit to the mains supply. A replacement cord can be purchased from Clipsal Integrated Systems if required.

·   Do not expose the unit to dripping or splashing.

·   Do not place objects filled with liquid (such as vases) on the unit.

·   Do not cover or block the vents on the Matrix Switcher enclosure.

·   The digital audio outputs must only be used with MRA Amplifiers.

·   Both C-Bus and digital audio cables are terminated with RJ45 connectors. Never plug either of these cables into the wrong socket. C-Bus cable is pink. The RJ45 sockets on the rear of the Matrix Switcher are identified in Figure 1.
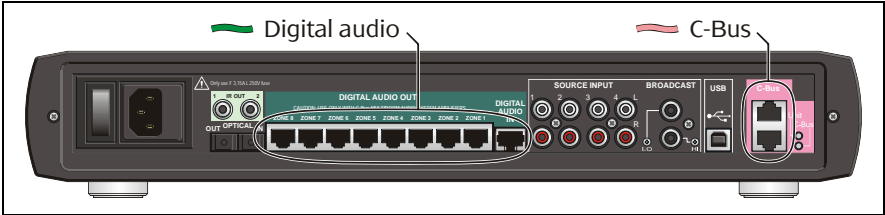
Figure 1 – Never plug a C-Bus cable into a digital audio socket or vice versa

3.0   Using the Matrix Switcher

This section describes how to use a Matrix Switcher which has been installed as part of a Multi Room Audio system. Installation details are provided in the Multi Room Audio System Installation Manual.

3.1   Powering the Unit

The Matrix Switcher must be plugged into an AC mains power outlet, via the supplied IEC type cable. A switch is located next to the AC power socket at the rear of the unit. Push the top of the switch inwards to turn the Matrix Switcher on.

3.2   Front Panel Control

The front panel of the Matrix Switcher (shown in Figure 2) has eight buttons which are used to view and control the status of each zone.
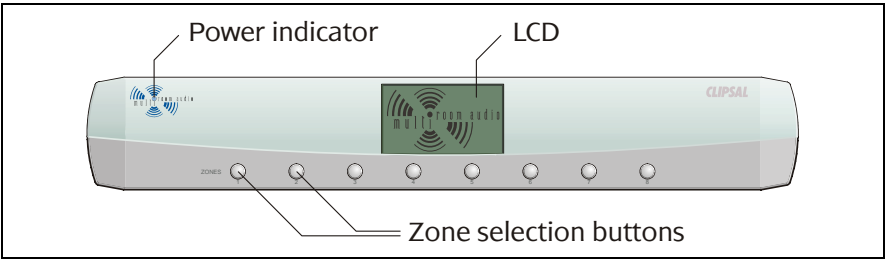

Figure 2 – Matrix Switcher front panel

NOTE ☞ The power indicator may be disabled by the installer (using the MARPA configuration software).

Pressing a Zone selection button displays the name and input source of the zone (as shown in Figure 3). Pressing the button again within 8 seconds selects the next input source which is routed to the zone.

In a typical Multi Room Audio system installation, there are several ways to change a zone's input source. You can do this via:

· a Zone selection button on the Matrix Switcher
· the Source selection buttons on a Desktop Amplifier
· a remote control used with a Desktop Amplifier
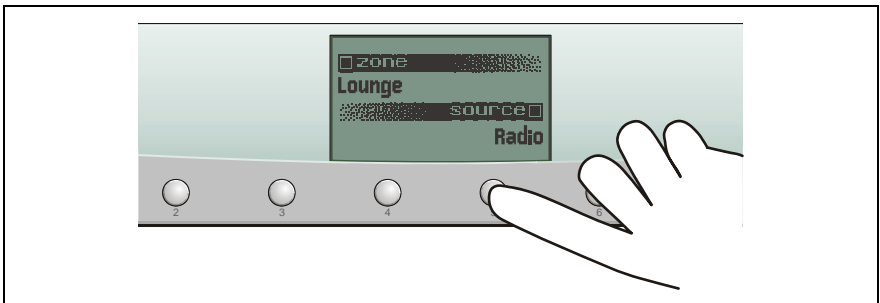· an appropriately configured C-Bus wall switch or touch screen.

Figure 3 – In this example the Radio input is selected for the Lounge (zone 5)

4.0   Annunciation

The Matrix Switcher has the capability of announcing the name of an input source whenever it is selected. This annunciation is broadcast through the speakers in the zone where the input source has changed.

Annunciation provides instant feedback when changing the source selection using a C-Bus switch, Amplifier or remote control.

NOTE ☞ The annunciation feature may be disabled by the installer (using the MARPA configuration software).

5.0   Rear Panel Connections

All connections to the Matrix Switcher are made via the rear panel. Connectors and indicators are identified in Figure 4 and described in Table 1.
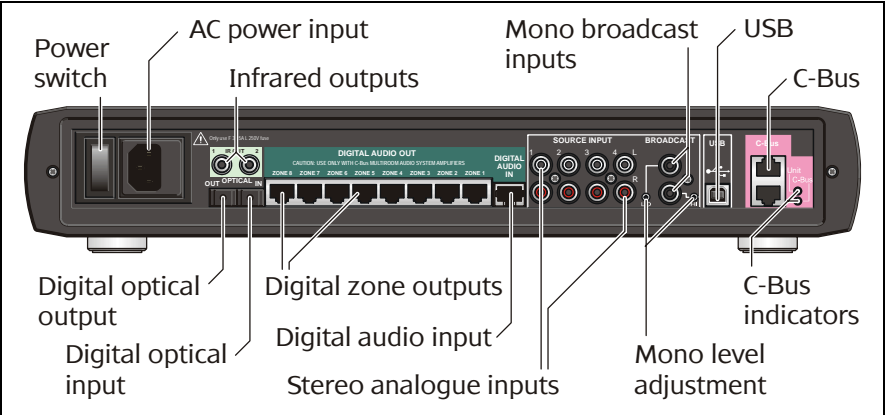

Figure 4 – Matrix Switcher rear panel connectors and indicators

Connection /Indicator	Description
Power switch	Switches the mains power input on and off.
Mains power input (IEC)	Connect mains here to power the Matrix Switcher. Since the Matrix Switcher provides power to connected Amplifiers, this connection also affects Amplifiers which do not have an external power supply.
Infrared outputs (×2)	Use these 3.5 mm sockets to connect to IR Emitter Leads. IR Emitters can be coupled to IR receivers on equipment, providing remote control from any zone through the Multi Room Audio system.

Connection /Indicator	Description
Mono broadcast inputs (×2)	Line level mono audio connected here is broadcast to all zones which have an analogue input source selected. There are two mono inputs with different priorities. Audio connected to the LO input is transmitted by Amplifiers at their current level. Audio connected to the HI input is transmitted at a preset level. Amplifiers which have a digital input source selected, change to the fourth analogue source so they can receive the high priority broadcast audio. Note: High priority (HI) broadcast audio uses left channel speakers. Low priority (LO) broadcast audio uses right channel speakers.
USB (Type B)	This is used by the installer to configure the Matrix Switcher.
C-Bus (×2)	Connects to the C-Bus network.
Digital optical output	Retransmits the data received by the digital optical input.
Digital optical input	Use this to connect a digital optical audio source to be distributed to any of the eight zones. The digital audio format must be 44.1 or 48 kHz stereo. Some digital audio formats (such as surround sound) are not compatible with the Matrix Switcher.
Digital zone outputs (×8)	Each zone output is used to connect the Matrix Switcher to one Amplifier in each zone. Additional Amplifiers can be added to a zone by connecting their Digital Audio In socket to the Digital Audio Out of an existing Amplifier.
Digital audio input	A Multi Room Audio Distribution Unit can be connected to this input, providing an additional stereo audio input.

Connection /Indicator	Description
Stereo analogue inputs (4× RCA pairs)	Connect up to four stereo analogue inputs to be distributed to any of the eight zones.
Mono level adjustment (×2)	These adjust the level of the audio source connected to the mono broadcast inputs. Use a small flat head screwdriver to rotate the control if the audio source is too quiet or loud.
C-Bus indicators	<u>Unit</u> On:　　　C-Bus network connected Flashing:　Data exchange in progress <u>C-Bus</u> On:　　　C-Bus network operational Off:　　　Insufficient C-Bus power or clock Flashing:　Insufficient C-Bus power

Table 1 – Matrix Switcher connectors and indicators

6.0   Care Instructions

The Matrix Switcher contains electrical and electronic parts. Note the following precautions:

- Clean using a soft lint free cloth.
- Do not use chemicals or spray cleaners when cleaning.
- Do not operate with wet hands.
- Do not use hard, sharp objects to select the controls.
- Allow adequate ventilation. Do not cover the unit.
- The Matrix Switcher is designed for indoor use only.
- Keep the unit away from water and other liquids.
- Do not expose the unit to high temperatures.

6.1   Replacing the Fuse

The fuse is located next to the AC power socket on the rear of the Matrix Switcher (as shown in Figure 5). To replace the fuse:

1) Switch the mains off at the power point. Unplug the power cord at both ends (the power point and Matrix Switcher).
2) Insert your finger against the right edge of the socket and lift the fuse compartment outwards.
3) Use a small instrument such as a screwdriver or pen. Insert the instrument through the hole on the right hand side of the fuse compartment, and push the fuse out.
4) Insert a replacement 3.15 A Fast Blow 20 × 5 mm fuse.
5) Close the fuse compartment by pushing it inwards.
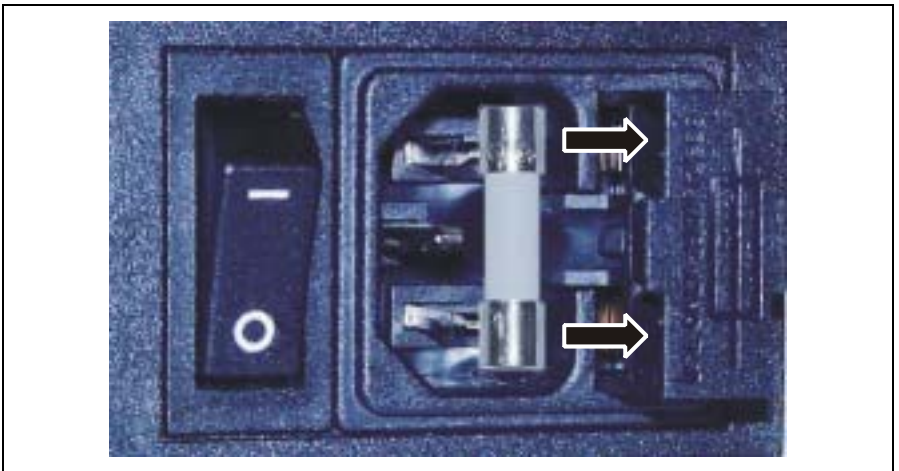
Figure 5 – Replacing the fuse

7.0   Broadcast Audio

The Matrix Switcher includes two broadcast inputs; 1 × high priority (labelled HI) and 1 × low priority (labelled LO). These allow a mono input such as a door bell, telephone extender or alarm to be broadcast throughout the Multi Room Audio system.

Audio connected to the low priority input is broadcast at the currently set volume, to all amplifiers which are switched on and have Source Input 1, 2, 3 or 4 selected.

Audio connected to the high priority input is broadcast to all amplifiers at a volume set by the installer (using the MARPA configuration software). Any Amplifiers which are in standby mode are switched on. All Amplifiers that are not switched off temporarily change to Source Input 4 to ensure the audio is broadcast as widely as possible. Five seconds after the broadcast audio ceases, Amplifiers return to standby (if applicable) and to their previously set volume.

These actions may vary depending on how the installer has configured the Matrix Switcher.

NOTES   Audio connected to a high priority broadcast input must be of sufficient volume to trigger a broadcast.

A high priority (HI) broadcast uses left channel speakers. A low priority (LO) broadcast uses right channel speakers.

8.0 Troubleshooting

Symptom	Possible Explanation
The Matrix Switcher no longer responds to button presses.	Switch the Matrix Switcher off for several seconds, then on. Use the power switch on the rear of the Matrix Switcher, next to the AC power socket.
Dynamic labels don't work on a C-Bus DLT wall switch.	There are several options which need to be selected for labels to function. These options are located: · on the More panel accessed by clicking the "More...." button on the Amplifier's C-Bus Control tab in Toolkit · on the DLT wall switch's Global tab in Toolkit · on the Zones branch of the Project tree in the MARPA software.
An Amplifier emits a high pitched screeching sound when a particular source is selected.	This may occur if an output of an Amplifier is connected to the input of the Matrix Switcher. Such a connection should be avoided as it can cause a feedback loop.
The Matrix Switcher does not power up.	The fuse may need replacing. Fuse replacement is described on Page 11.
Audio is not broadcast via the Matrix Switcher's high priority (HI) broadcast input.	The level of the audio connected to the broadcast input may not be sufficient to trigger the broadcast.
Cannot hear any sound when using the optical input	The digital audio source may be connected to the optical output instead of the input. Some digital audio formats (such as surround sound) are incompatible with the MRA system.

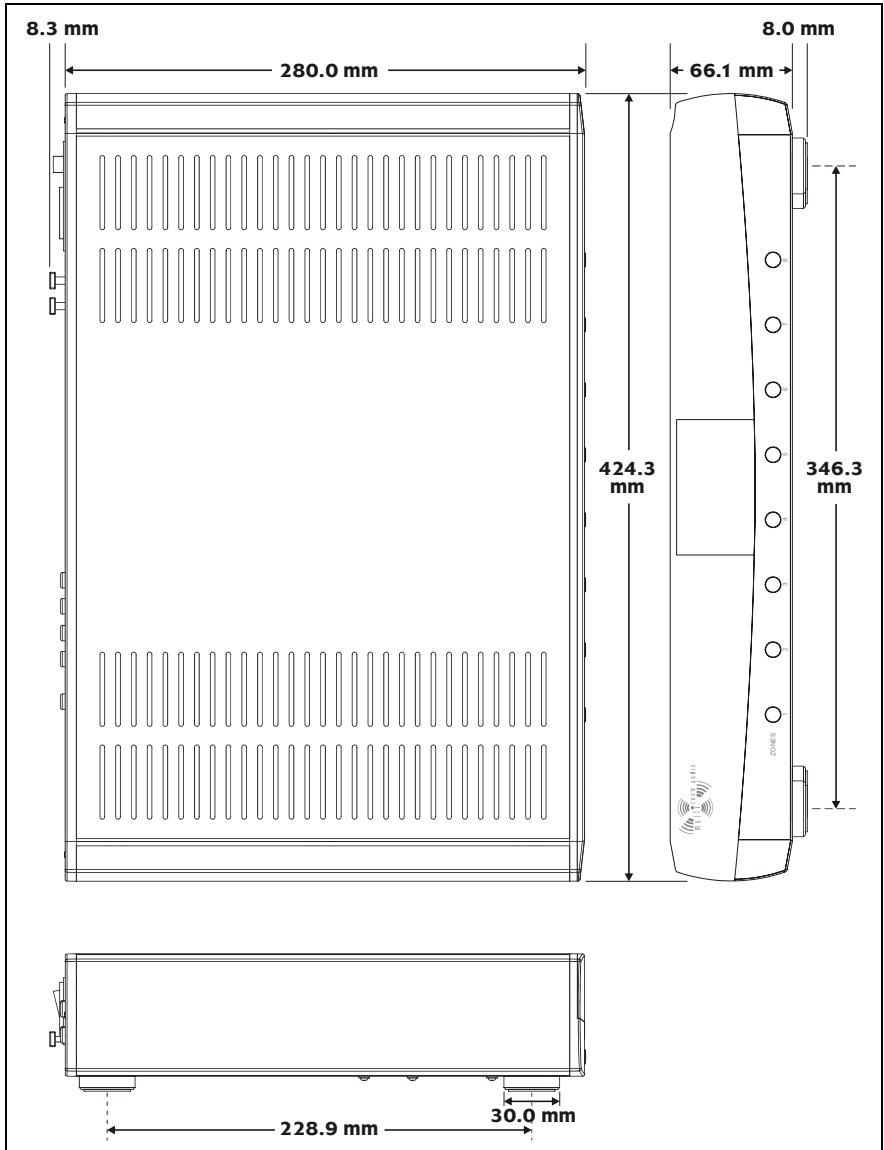# 9.0   Electrical Specifications

9.1   Matrix Switcher

Parameter	Description
Supply voltage	240 V AC
Mains frequency range	47 to 53 Hz and 57 to 63 Hz
AC input impedance	47 kΩ
Power consumption	200 W maximum
C-Bus output voltage	36 V DC maximum
C-Bus output current	$\leq$ 330 mA
Network clock and burden	Software selectable
Analogue input signal level (Source inputs)	2.8 V p-p maximum (47 k Ω)
A/D conversion	16 bit PCM
Operating temperature	10 to 40 °C (50 to 104 °F)
Operating humidity	10 to 90% RH (non-condensing)

9.2   System Audio Performance

Parameter	Matrix Switcher + Amplifier*
Frequency response	40 Hz to 20 kHz (+2.4/−0.75 db)
Total harmonic distortion (1 kHz, 20 W RMS into 4 Ω)	0.16%
Signal to noise ratio	> 63 dB (peak, unweighted)

* Analogue inputs of Matrix Switcher, measured from Amplifier speaker outputs

10.0 Mechanical Specifications

8.3 mm

280.0 mm

8.0 mm

66.1 mm

424.3 mm

346.3 mm

228.9 mm

30.0 mm

ZONE B

11.0 Standards Complied

DECLARATIONS OF CONFORMITY

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards
The Multi Room Audio Matrix Switcher complies with the following:

Regulation	Standard	Title
Electrical Safety	AS/NZS 60065	Audio, video and similar electronic apparatus - Safety requirements
EMC (C-Tick)	AS/NZS CISPR 22	Information technology equipment - Radio disturbance characteristics (emissions)

12.0 Warranty

The Multi Room Audio Matrix Switcher carries a two year warranty against manufacturing defects (refer to the Warranty Statement).

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Intermediate 3 C-Bus Training Course

Programming Amplifiers

Course Code: ICB003

Revision Number: V1.0

V1.0 Jan 2006

Contents

Overview

This manual is part of the Intermediate 3 Training Course. It is designed to give the user a guide on how to program a multi room system. This manual covers the programming of the Amplifier range. The manual also covers the control of the amplifier via a C-Bus input unit.

Requirements of attending the Intermediate 3 course are as follows. The attendee must have attended a C-Bus basic and Intermediate 1 course. Attendees must be able to scan the C-Bus network and make changes without assistance.
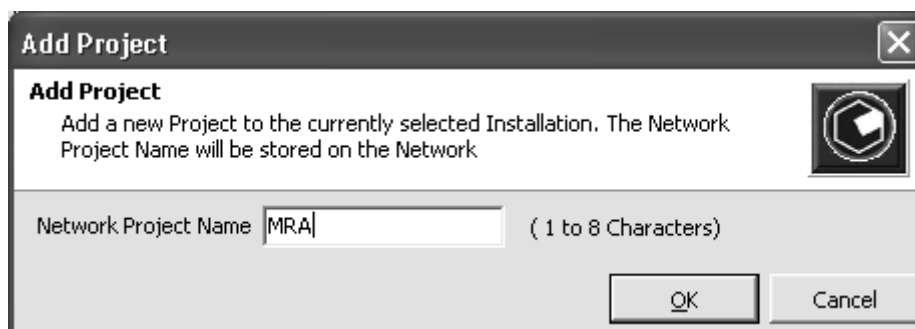
1.0   Starting a New Project

The software required for the programming of the Amplifiers is the Toolkit software version 1.2 or higher. To open the software select the start menu/clipsal/C-Bus toolkit
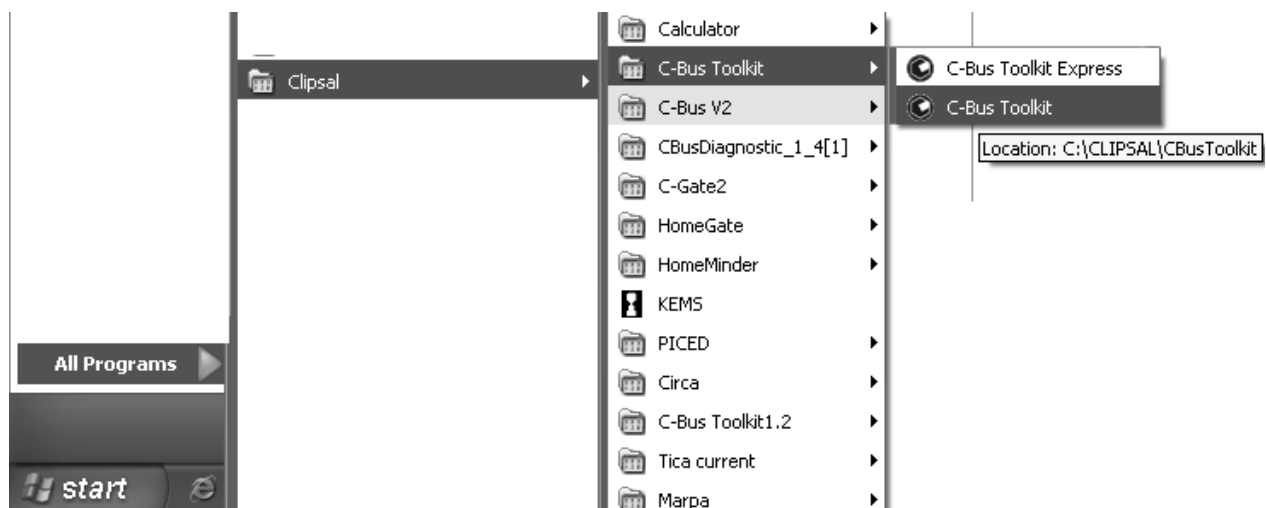
1.1 Creating a New Project

Start a new C-Bus project called MRA

1.2 Programming the Amplifiers

The Multi Room Audio Amplifiers are available in two ranges they are a desktop mounted amplifier and a remote mounted amplifier.

The difference between the two amplifiers is the desktop amp has push button controls at the front of the unit it also has the ability to be controlled via a remote control (supplied with the unit). The front view of the desktop Amplifier is displayed in figure 1
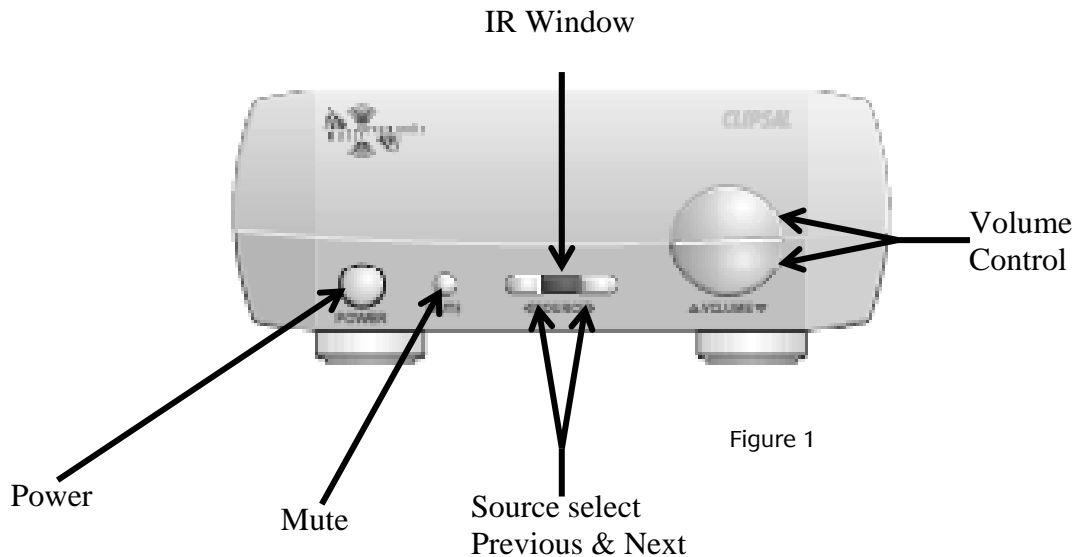
IR Window

Volume
Control

Figure 1

Power

Mute

Source select
Previous & Next

1.3   Programming a Desktop Amplifier

If you have a Desktop amplifier connected to the network open the GUI for the desktop amplifier the unit type is PC_WHAD-Multi Room Audio (Desktop).
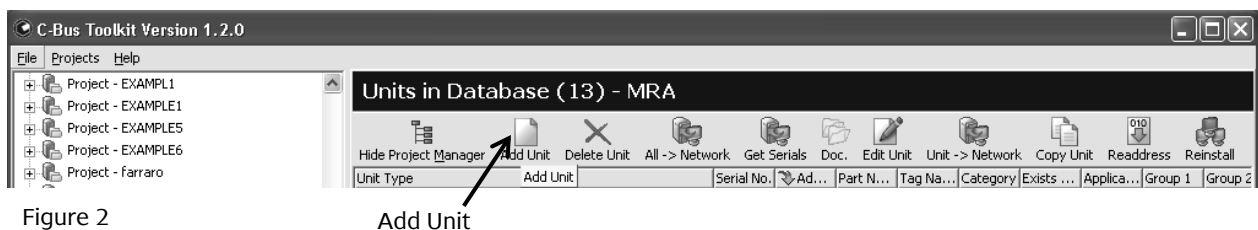

Figure 2

Add Unit

If you are working in the database select add unit button as per Figure 2.

The unit selection option will then appear. Search for the Desktop amplifier (PC_WHAD) part number 560125D as per figure 3. Once you have selected the amp select ok.
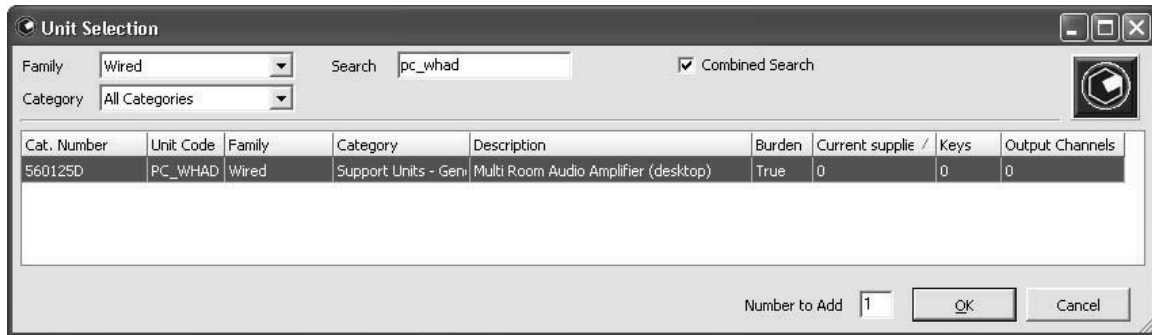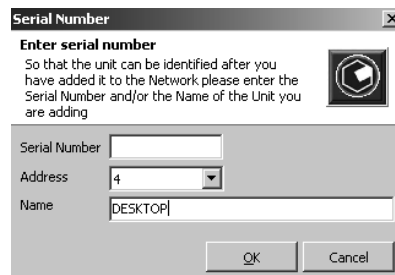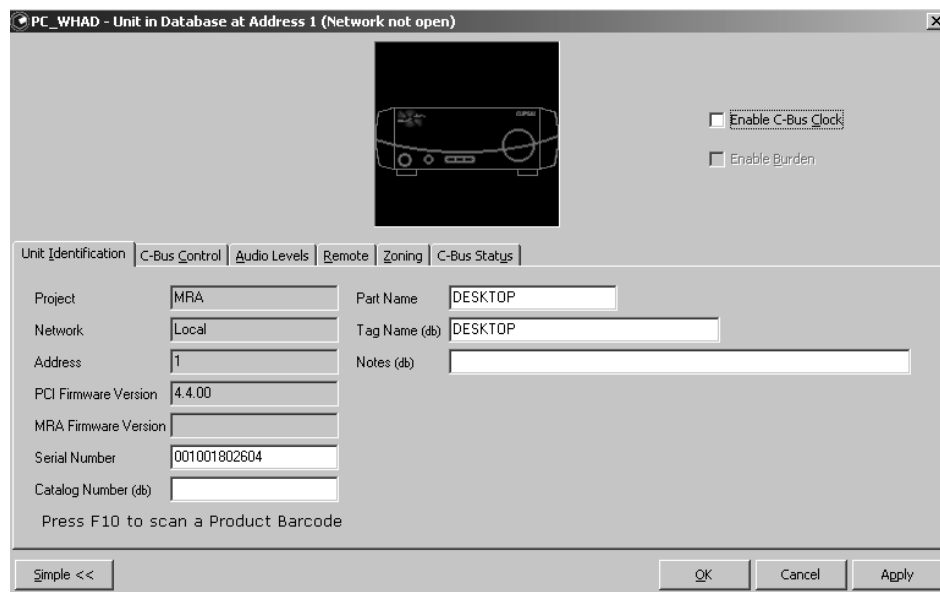
Figure 3

Assign a Unit address for the amplifier and a serial number if it is available, then click OK again.

The amplifier has now been loaded into the project. To open the GUI of the unit double click on the unit.

1.4   C-Bus Control

Once the GUI is opened, select the C-Bus Control tab.

From here you can assign the following options

Volume,

By assign a C-Bus group to this option the amplifier Volume can be adjusted via C-Bus

<u>Bass,</u>

By assign a C-Bus group to this option the amplifier Bass can be adjusted via C-Bus.

<u>Treble,</u>

By assign a C-Bus group to this option the amplifier Treble can be adjusted via C-Bus.

<u>Next & Previous Source</u>

When the Next and Previous Source groups are used, the Amplifier will cycle through all the available sources in a given order (Local, Analogue 1, Analogue 2, Analogue 3, Analogue 4, Digital and Optical). This is fine for using on a DLT or Key unit if you have multiple sources. However if you want to control the system from a touch screen Absolute Source may be an easier option.

When using a DLT switch the Next and Previous buttons will display the Source currently selected.

<u>Absolute Source</u>

A group address is given to the Absolute Source. Each source is assigned a pre-set level. The desired source can then be selected by programming a touch screen button or key unit key with the Absolute Source group address set as a preset to the given level. By doing this you can have seven different buttons, which will directly switch to whichever source you choose. Pressing the Parameters button on the C-Bus control tab of the Amplifier GUI will display the levels for the different sources.

Absolute Source Levels		
Group address 6		Group name 1 Absolute
Level	Source	Tag Name
1%	Local Input	Local Input
2%	Analogue Source 1	Analogue Source 1
3%	Analogue Source 2	Analogue Source 2
4%	Analogue Source 3	Analogue Source 3
5%	Analogue Source 4	Analogue Source 4
6%	Digital	Digital
7%	Optical	Optical
Default		OK Cancel

<u>Dynamic 1 & 2</u>

The dynamic 1&2 buttons will change functionality depending on which source is selected on the amplifier.

These groups are used to display and control IR commands between a Matrix Switcher and Audio Source and will be explained in more detail in the Marpa Training Manual.

Assign a group addresses to each of the options under C-Bus control. They should be given descriptions that are easy to follow and relevant to the zone you are connected to, eg Zone1 Volume, Zone3 NextSrc. As per figure 4
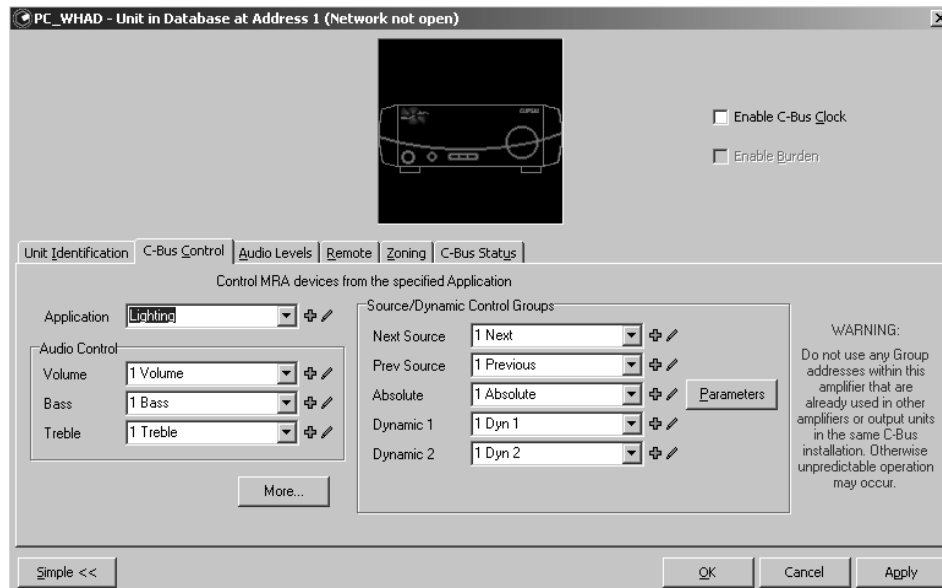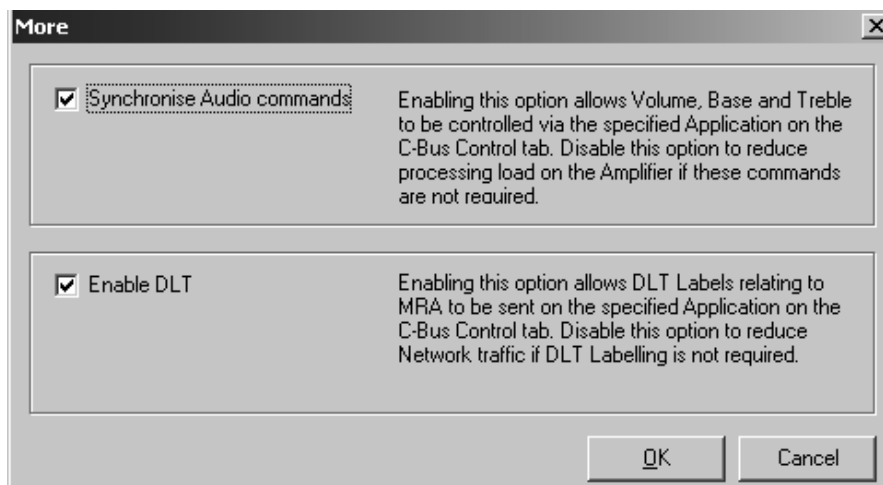

Figure 4

The 'More' button in the C-Bus Control tab of the amplifier GUI gives you some options that help reduce the processing time of an amplifier and the DLT's that are associated with it on the network.


1.5 Audio Levels

The 'Audio Levels' tab in the GUI of the Amplifier is where things like Volume, Bass, Treble and Balance can be adjusted when you are connected to the network. From here you also have some options to activate/deactivate High Priority Broadcasting and to set the amplifier as a master or a slave. If multiple amplifiers are being used on the one zone try to make sure that desktop amps stay as masters, as they lose most of their functionality otherwise unlike the remote amp.
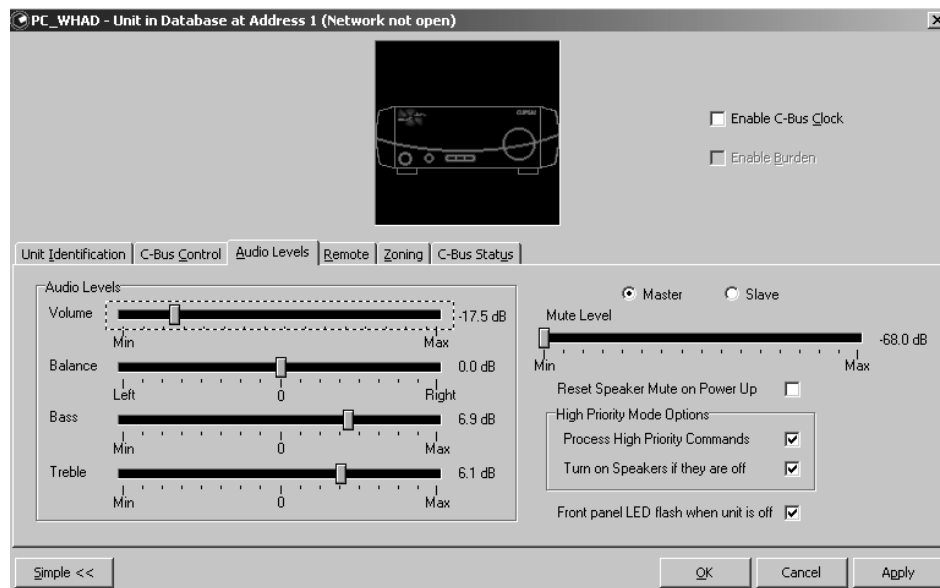
1.6　Remote Control

The 'Remote' tab is not available on the Remote Amplifier, as this type of Amp doesn't have an IR receiver. This part of the GUI however allows you to set which type of remote you want to use to control the Amplifier. A 14 key remote is supplied with the Desktop Amplifier the codes are already set for this type of remote. A C-Bus 5035 remote is also compatible with this Amplifier and its codes are also set in the GUI. The other option is to select 'Other' this enables you to set your own remote codes to control the Desktop Amplifier.
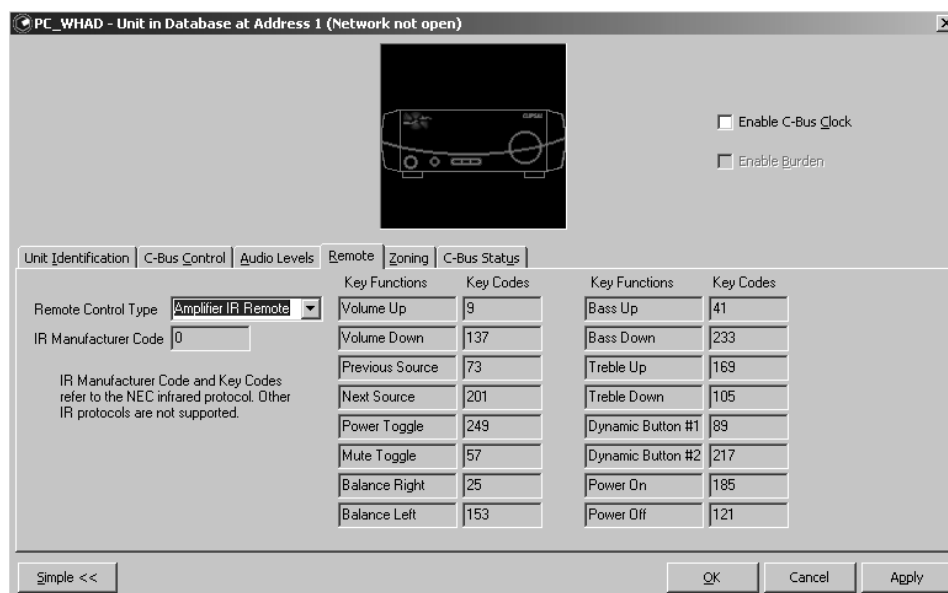
1.7　Amplifier Zoning

The Zoning tab that is in the Amplifier GUI allows you to set the zone number of an amplifier. This is usually set to auto assign however if you are cascading amplifiers on the one zone then they need to be configured here.
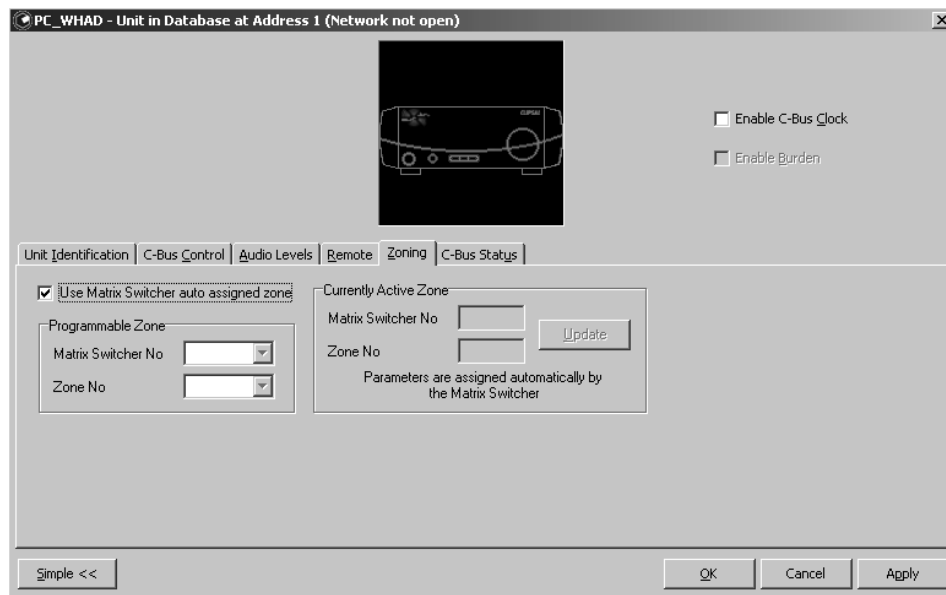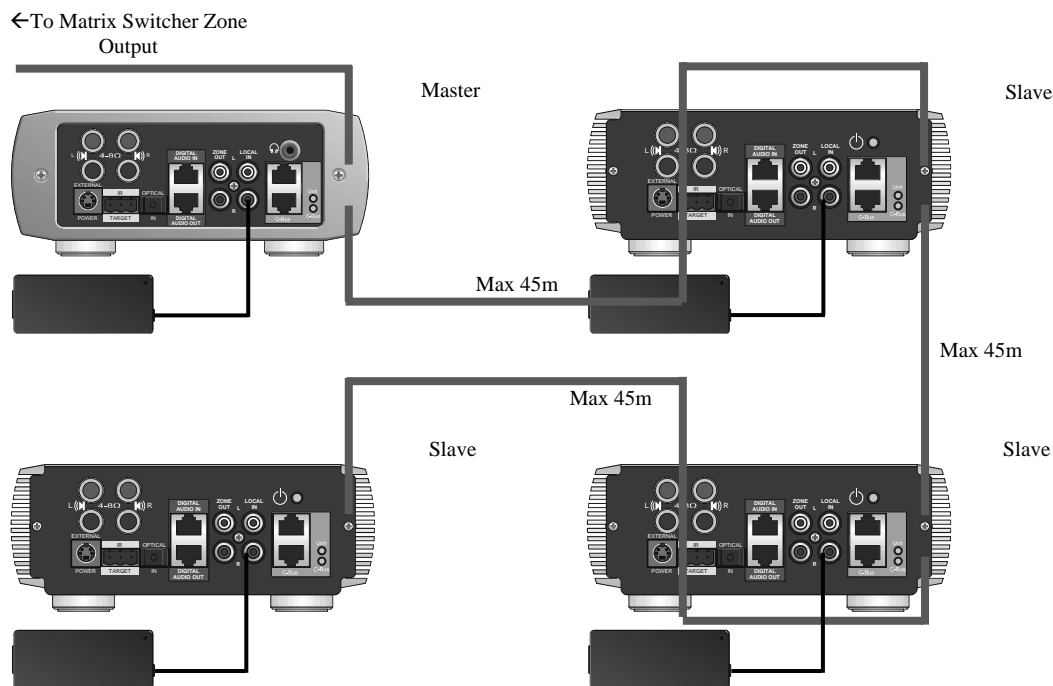
2.0 Cascading Amplifiers

There are two ways to cascade Multi Room Audio amplifiers, both suit different types of applications.

2.1 Series Configuration

If all the amplifiers that are being cascaded on the one zone are to be controlled identically, i.e. all have the same volume levels and sources playing at the same time, then the amplifiers can simply be cascaded by connecting the 'Digital Audio Out' from one amp to the 'Digital Audio In' of another. In this configuration there can be 45 metres of cable between each amplifier. One of the amplifiers on the zone should be set as a master and the rest as slaves in the audio levels tab of the amplifier GUI. It is preferable to set desktop amplifiers as masters because unlike remote amps they lose functionality if they are slaves. This configuration can be limited in the sense that if an amplifier in the series is turned off then all the preceding amplifiers will not be on.

This configuration requires each amplifier to have its own external power supply connected, the Clipsal part number for this power supply is 5600P24/3750AU.

←To Matrix Switcher Zone
  Output

Master

Slave

Max 45m

Max 45m

Max 45m

Slave

Slave

2.2   Parallel Configuration

The other option allows a little more flexibility. You can cascade the amplifiers by connecting all the 'Digital Audio In' inputs together using a number of RJ-45 splitters. All of the amplifiers on this zone can then be switched on or off and can play either their local source or the source being distributed to the zone by the Matrix Switcher. This configuration doesn't rely on the preceding amplifiers in the loop to be on. When using this configuration there can only be a total of 45 metres between the matrix switcher and the last amplifier.

In this configuration the power is shared to the amplifiers.

Max Cable length from
Matrix Switcher to last
Amplifier is 45m

RJ45 Splitter
CIS# 5600TEE

←To Matrix Switcher Zone
  Output
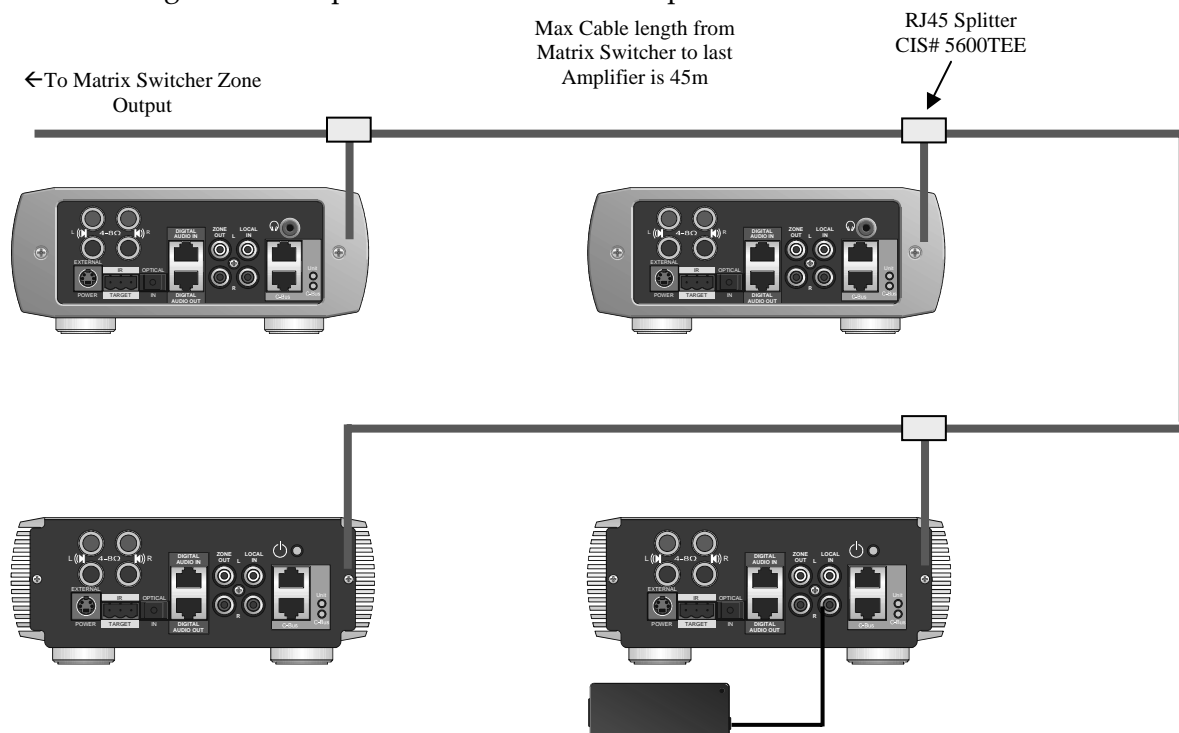
In the Audio Levels tab of the Amplifiers GUI there is an option to set an amplifier as a Master or a Slave. This feature, along with some of the options in the Zoning Tab allow you to control the amplifiers on a cascaded zone much easier.
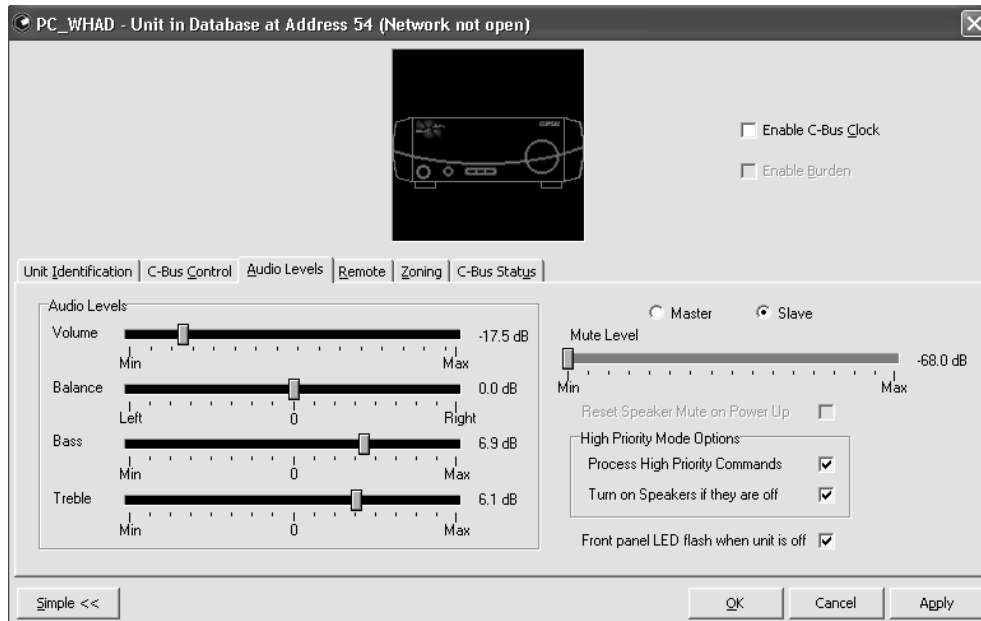
If the amplifier is set as a slave then it looses its C-Bus Control functions.
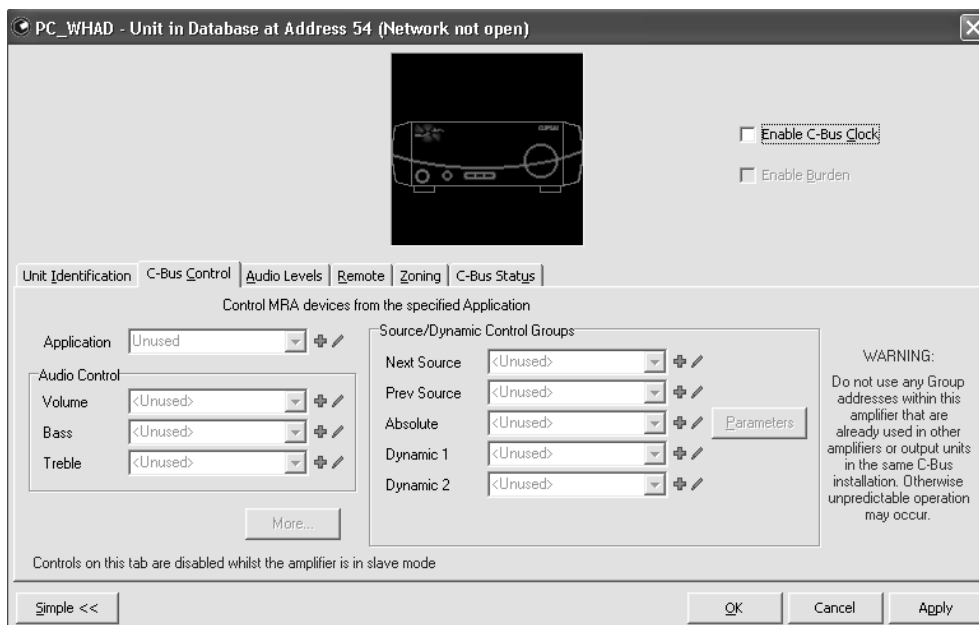
Using one Master amplifier on a cascaded zone in a series configuration will allow you to control all the amplifiers identically. However if one amplifier in the series is turned off, then the preceding ones will also switch off.

To obtain individual control of each amplifier on a cascaded zone, you should set them all as masters. If you are using a series configuration for this you will have the same effect in the sense that when one amplifier in the series is switched off the preceding amps will also go off.

There is another option to set all the amplifiers as masters in a parallel configuration. This will give you control over every amplifier in the zone and wont rely on the other amplifiers to be on.

If you require individual control of the amplifiers in a cascaded configuration they each need to be assigned their own Matrix Switcher number and Zone number in the Zoning tab.
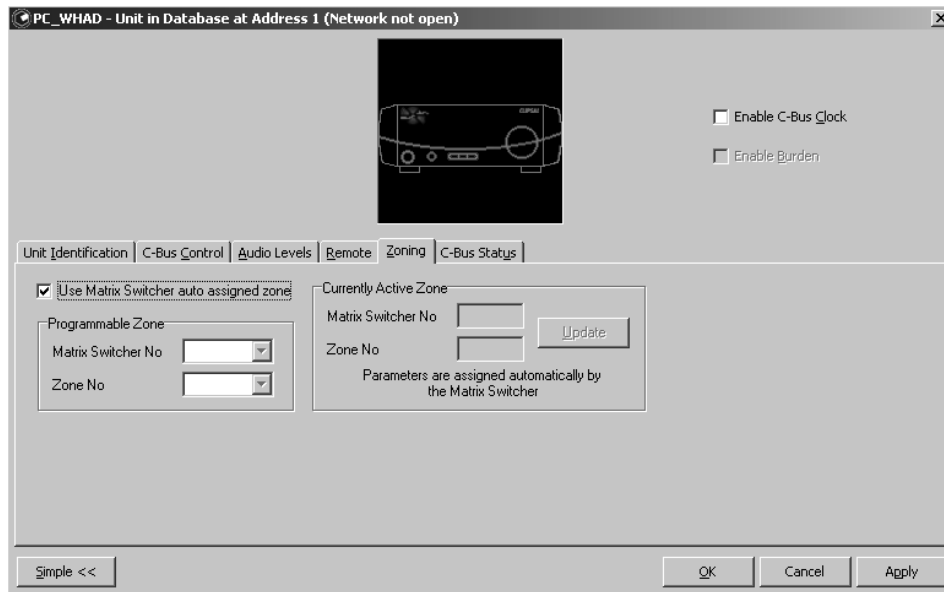

3.0   C-Bus Input Units

A Multi Room Audio system can be completely controlled by C-Bus key units, DLT's and Touch Screens. These units are programmed using either C-Bus Toolkit or PICED software.

3.1   Programming DLTs

Key units such as Saturn or Neo switches are a simple way of controlling one zone. DLT's however are a more common alternative as you can see which keys are doing what. The top two keys can be set to control lighting in the room. The next can be a toggle dimmer which controls the Volume of the amplifier in the room. The final button on the first page can be given an On/Off C-Bus function and assigned the Next Source of the amplifier. The keys on an input unit that control the Next Source, Previous Source, Dynamic 1 and Dynamic 2 should all be given an On/Off function. When these keys are pressed the state of the group will be set to on. Once the amplifier receives the command it will execute and then set the group address back to off.

The second page can be assigned group addresses that control the Bass, Treble Dynamic 1 and Dynamic 2 of the amplifier. The Dynamic Groups are essentially 'dummy' groups. The labels and functions of these groups change when the amplifier source changes. These functions and labels are set in the MARPA software.
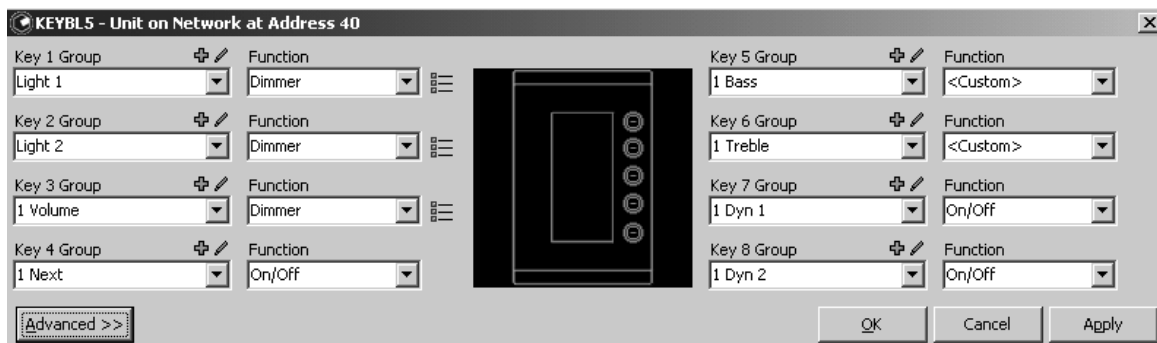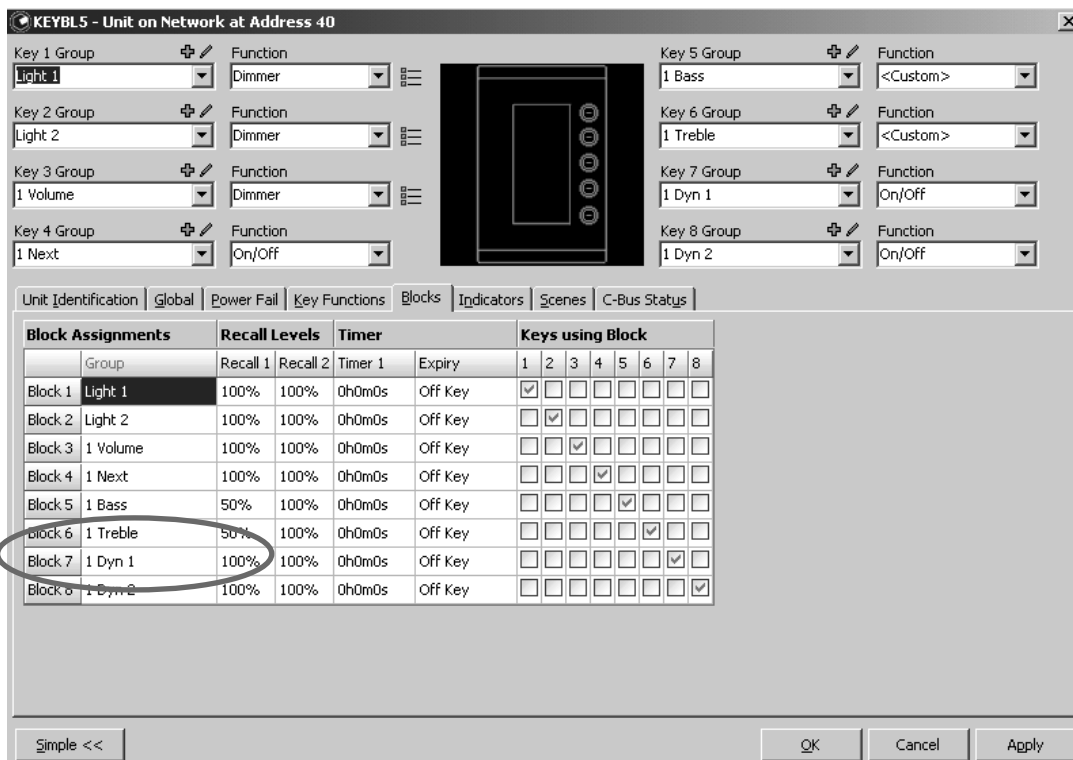
3.2   Bass and Treble Levels Using One Button

If you are using one button to control the Bass or Treble functions on a DLT you may want the levels pre-set at 50%. To do this go to the key functions tab in the DLT and set the corresponding keys to those highlighted in the figure below.
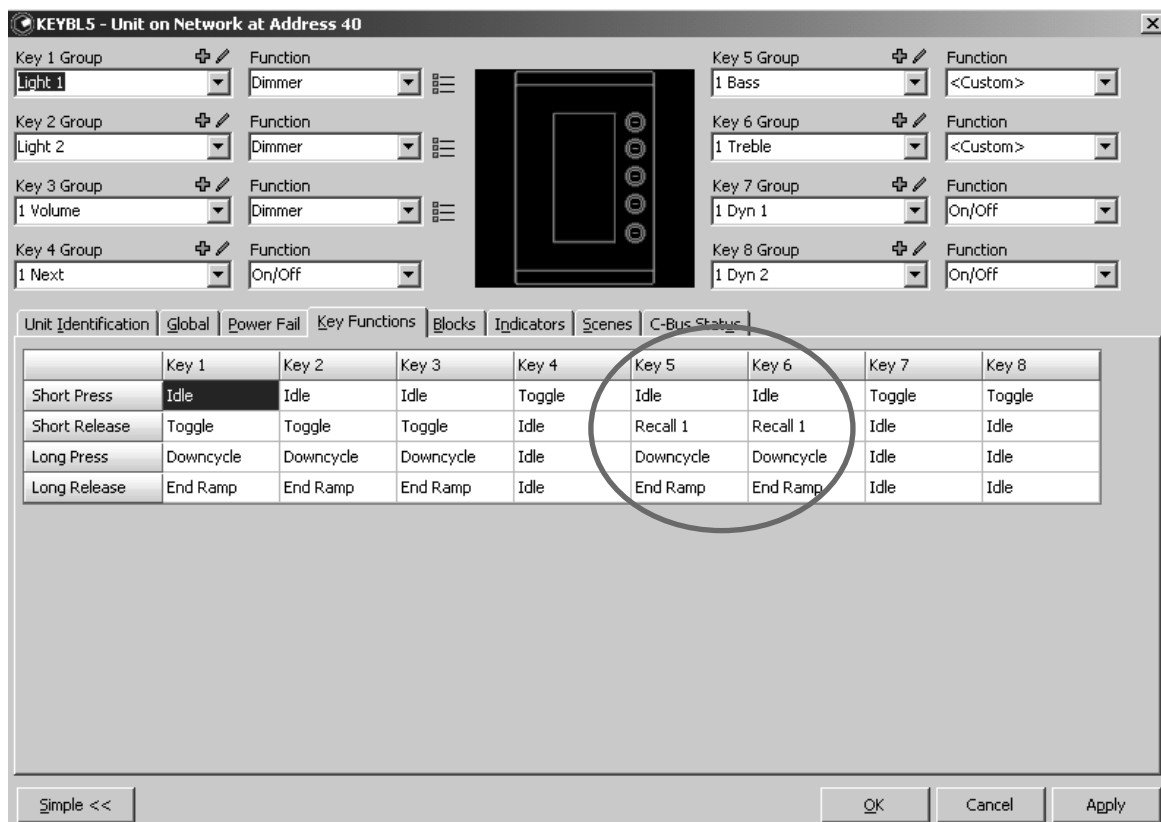

The Recall 1 level also needs to be set for this function to work properly. This is done in the Blocks tab on the DLT GUI as shown below. Once these steps have been completed a short press on the bass or treble key will set the level to 50% a long press will ramp the bass or treble level up or down just like a toggle dimmer. This can also be done to give you a pre-set volume on an amplifier with a short press.

3.3   Bass and Treble Levels Using Two Buttons

If you decide to use an 8 button Neo or similar just to control your Multi Room Audio system you can use two keys to control the Bass or Treble to the same effect as that described above. The main difference being that instead of having a Downcycle function on the key for a Long Press, one key can be changed to Up Key and the other to Down Key, as shown below.
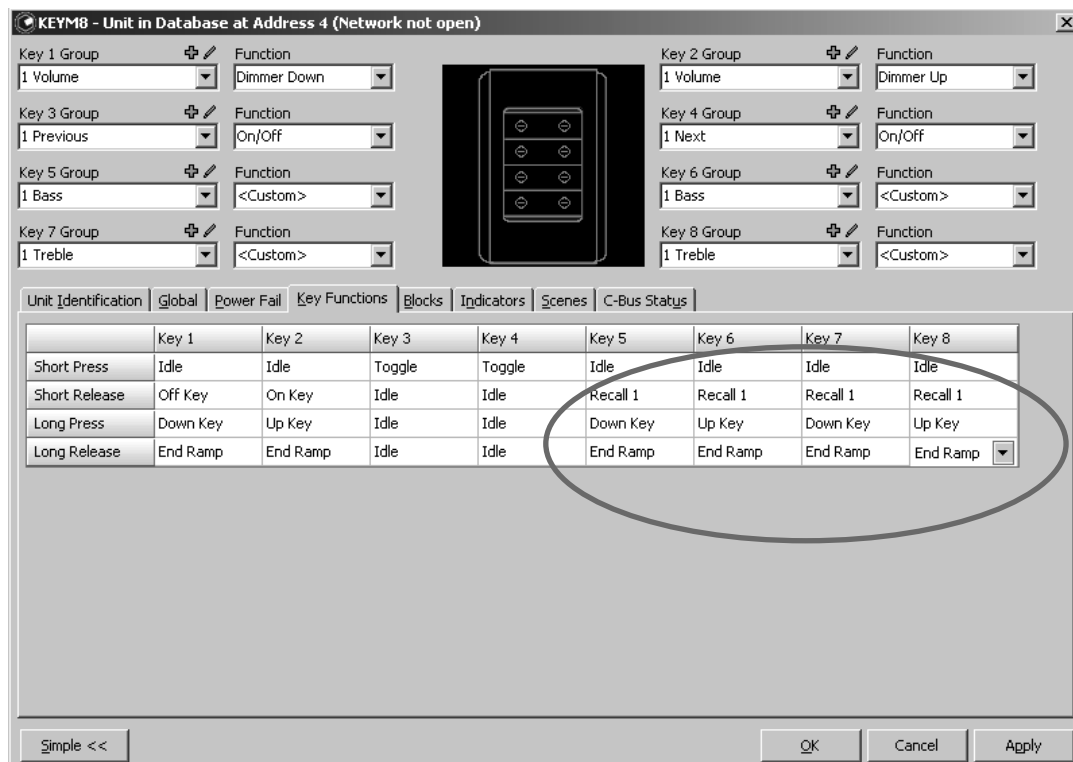
3.4 Basic Touch Screen Options

Touch screens, be they black and white or colour, give you the most control over a Multi Room Audio system. Pages that are dedicated just to an MRA system can be set up and allow you to control everything from speaker balance to CD Skip. Multi Room Audio products can be incorporated into scenes to set an even higher intensity mood. The C-Bus commands used on a touch screen are the same as those on a Key unit.

The image below is of a Touch Screen page that is controlling an audio source on a Multi Room Audio network. The source is a CD player and the Matrix Switcher has been programmed with the IR codes to control the CD player. The different buttons on the page have an On/Off C-Bus function.

Absolute sources are a feature of the Multi Room Audio system that allows you to directly select a source instead of cycling through the sources. This is shown below. Each of the four buttons that select a source all have the same group address. They are all set as presets with different levels. 'CD Player' is Analogue 1 and is set to 2%, 'DVD' is Analogue 2 and is set to 3% etc.
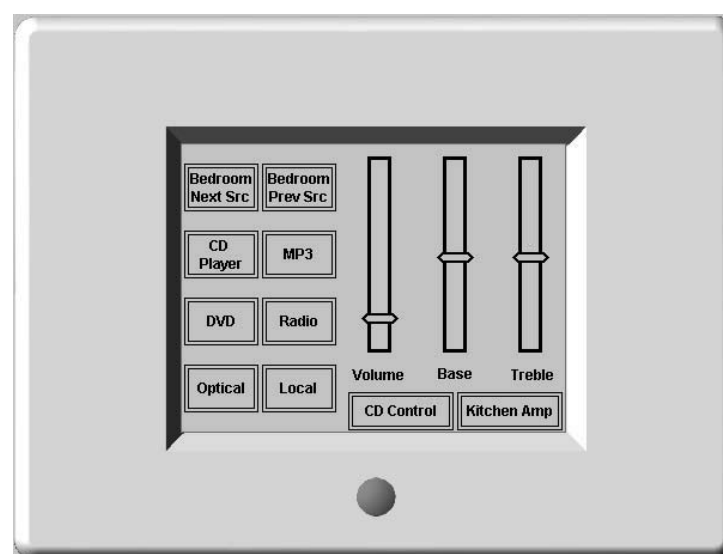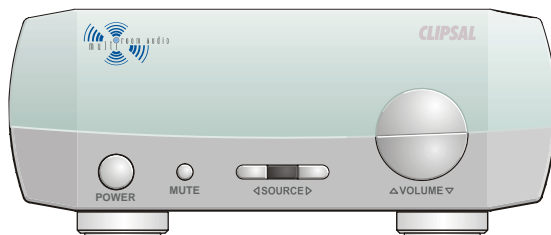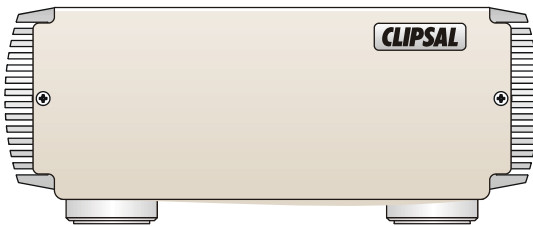
Multi Room Audio Amplifier

User's Guide

560125D   Remote Amplifier

560125R   Desktop Amplifier

Contents

1.0   Product Range

560125D   Multi Room Audio Amplifier (Desktop Mounting)

560125R   Multi Room Audio Amplifier (Remote Mounting)

2.0   Important Notes

·   The Multi Room Audio (MRA) Amplifiers are suitable for operation in moderate to tropical climates. The units should be mounted indoors only.

·   MRA Amplifiers disperse heat through the fins on their sides. Ensure at least 50 mm of free space is available at each side of the Amplifier for ventilation.

·   Only use a Clipsal approved power supply to power an MRA Amplifier. Failure to do so may damage the unit, and void the warranty.

·   Both C-Bus and digital audio cables are terminated with RJ45 connectors. Never plug either of these cables into the wrong socket. C-Bus cable is pink. The RJ45 sockets on the rear of the Desktop Amp are identified in Figure 1.
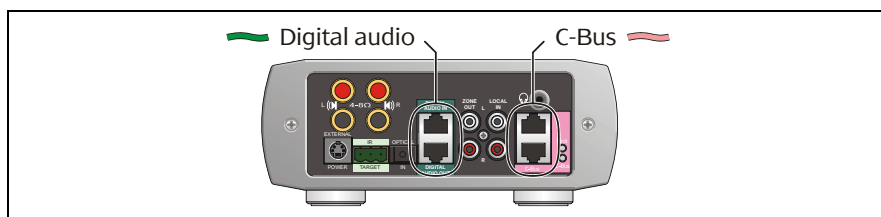

Figure 1 – Never plug a C-Bus cable into a digital audio socket or vice versa

3.0   Description

A Multi Room Audio (MRA) Amplifier is used as part of a C-Bus enabled audio distribution system. It provides audio which is controllable via C-Bus wall switches and other C-Bus devices such as the C-Touch Colour Touch Screen.

MRA Amplifiers are typically used in conjunction with the MRA Matrix Switcher. A Matrix Switcher distributes audio from multiple sources (such as a radio, TV and CD player) to up to eight zones. (A zone consists of one or more MRA Amplifiers). An example of this configuration is shown in Figure 2.
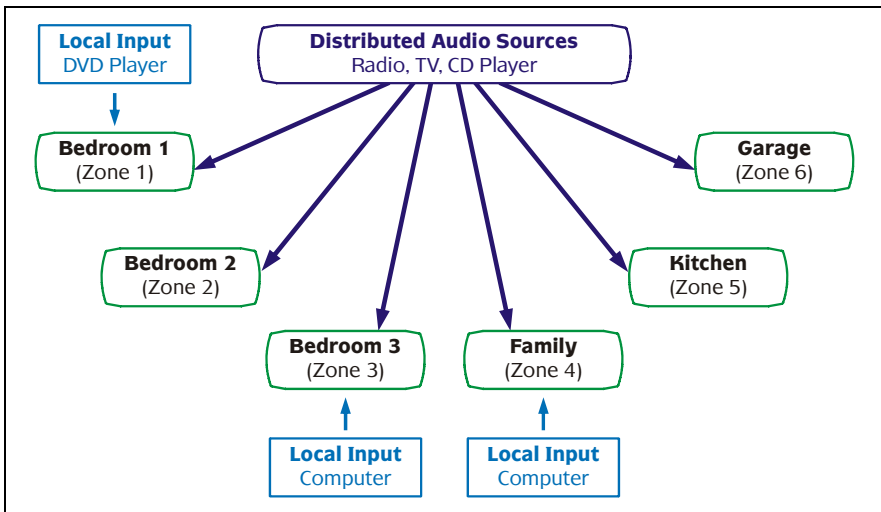
Figure 2 – An example audio distribution configuration using a Matrix Swticher

MRA Amplifiers can also be used without a Matrix Switcher. In this case a Distribution Unit is used to distribute audio from a single source (such as a radio) to one or more MRA Amplifiers. An example of this configuration is shown in Figure 3.

In addition to the distributed audio, each MRA Amplifier accepts a local audio source (local input). This allows you to connect audio from a source such as a PC or portable audio player, which will be available to the specific Amplifier only.
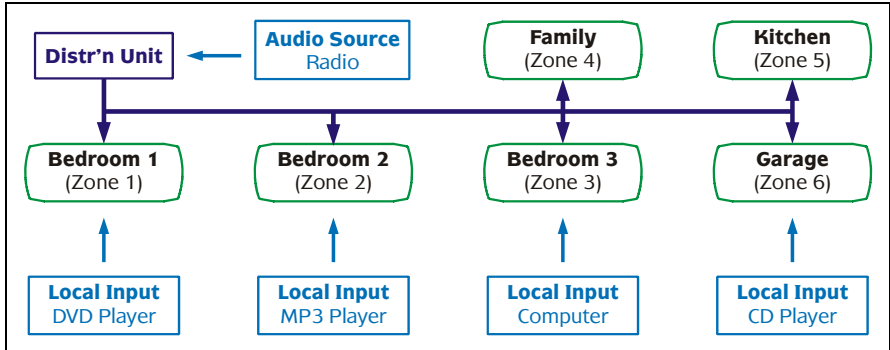
Figure 3 – An example audio configuration with no Matrix Switcher

4.0   Using the Amplifier

This section describes how to use an Amplifier which has been installed as part of a Multi Room Audio system, or as a standalone unit. Installation details are provided in the Multi Room Audio System Installation Manual.

There are several methods in which a Multi Room Audio system can be controlled. The methods will vary depending on how the installer has configured the system and on which components have been used.

4.1   C-Bus Switch Control

Figure 4 – Example of a DLT switch used to control one zone in an MRA system

The most common method of control is via C-Bus switches such as the Neo, Ulti Saturn and Dynamic Labelling Technology (DLT) range. Buttons on a C-Bus wall switch can be used to control the volume/on/off (combined), bass, treble and source selection. A C-Bus wall switch may provide both lighting and audio control.

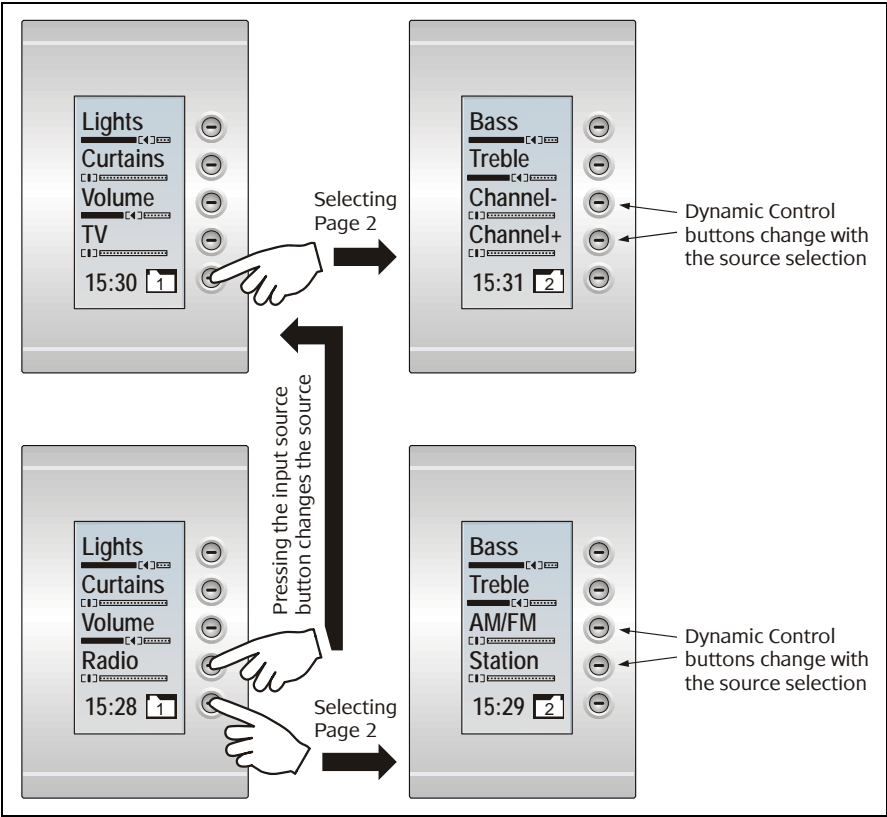Two Dynamic Control buttons may be used to control equipment in different ways depending on which source is selected. For example such buttons may be pre-programmed to send IR control codes tailored for the audio source equipment connected to the MRA system. Whenever the audio source is changed, the buttons' IR codes change to match the selected audio source.

Figure 4 shows an example of a C-Bus DLT wall switch which has been configured to control audio in a particular room (zone). The DLT is also used to control the lights and curtains. When the TV source is selected, the Dynamic Control buttons are used to change the television channel. When the Radio source is selected, one Dynamic Control button changes the radio band (AM/FM) and the other changes the station.
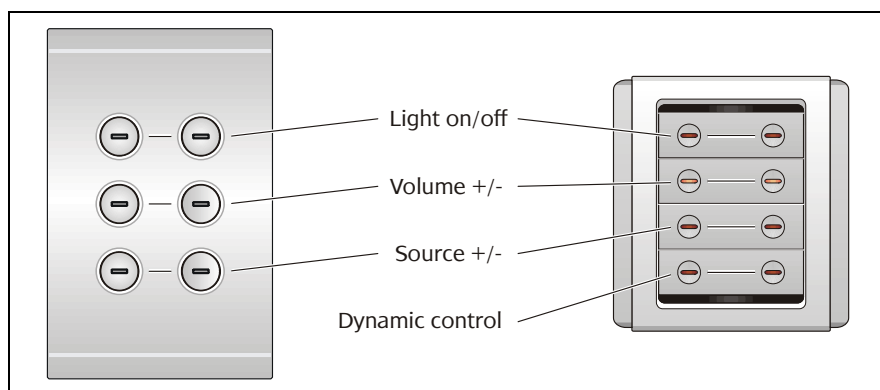
Figure 5 – Possible button assignments on an Ulti Saturn and Neo wall switch

Figure 5 shows possible control configurations for an Ulti Saturn and Neo wall switch. The top two buttons control a light and the remaining buttons control audio. The bottom two Neo buttons are used for dynamic control.

Volume buttons are typically multipurpose. A quick-press toggles the Amplifier between on and standby. A long press (of more than 400 ms) adjusts the volume. This action may vary depending on how the installer has configured the system.

Other C-Bus devices may be used to provide control over a Multi Room Audio system or standalone Amplifier. The C-Touch Colour Touch Screen is one such example. You can use the Colour Touch Screen to control a Multi Room Audio system according to a schedule.

4.2   Front Panel Control

The Desktop Amplifier (shown in Figure 6), can be controlled from the front panel. Table 1 describes its button functions. The Remote Amplifier is controlled entirely from C-Bus, and has no controls on its front panel.
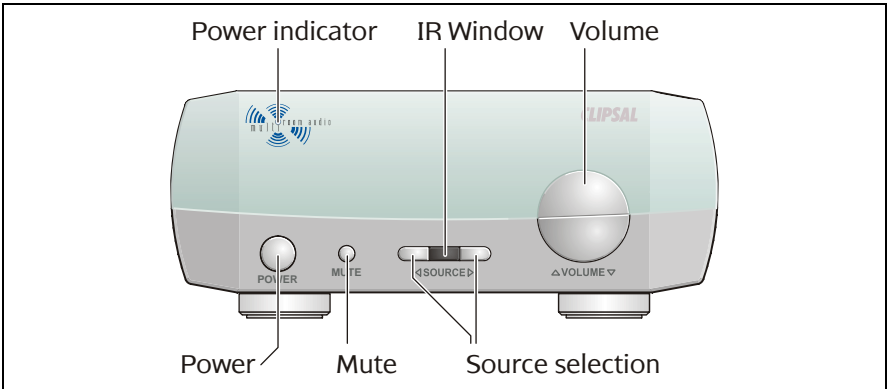
Figure 6 – Desktop Amplifier front panel

Button	Description
Power	Quick press: Switches the Amplifier on or to standby.
	Long press: Pressing the button for more than 400 ms switches the Amplifier off. When in standby, the Amplifier can be switched on via C-Bus or a remote control. When off, the unit will not respond to C-Bus or remote control.
Power indicator	On: Amplifier switched on. Off: Amplifier off. Off with 5 second flash: Amplifier in standby. On with flash: IR remote control code received.
	Note: The 5 second standby flash may be disabled by the installer (using the C-Bus Toolkit software).

Mute	Quick press: Sets the audio output (speakers and head-phones) to a preset (typically low) level configured by the installer. Returns to the previous volume when pressed again. If the Power button is used to switch between standby and on, the Mute status is retained.
	Long press: Pressing the button for more than 400 ms causes the speakers (but not headphones) to mute. This state is reversed by another long press.
	This action may vary depending on how the installer has configured the system.
IR Window	The infrared (IR) receiver. Point an appropriate IR remote control at this window to control the Amplifier.
Source selection	Selects which audio source is received. The right and left buttons cycle forward and backward through the available audio sources.
	If the Amplifier is used in standalone mode (with no Matrix Switcher), the Source buttons select between the local and digital/optical input.
Volume	Increases and decreases the volume. Cancels the Mute status if both speakers and headphones are muted.

Table 1 – Desktop Amplifier identification

4.3   Desktop Amplifier Remote Control

The Desktop Amplifier has an infrared (IR) receiver built into its front panel. This allows you control the Amplifier with an infrared remote such as the MRA Desktop Amplifier Remote Control (shown in Figure 7).

Figure 7 – The Desktop Amplifier Remote Control

An installer can configure a Desktop Amplifier to be controlled via an alternative remote control, such as the 5035TX. The 5035TX is used to control the Scene Master and C-Touch Mono Touch Screen. Figure 8 shows the button assignments used when the Desktop Amplifier is configured to work with this type of remote.
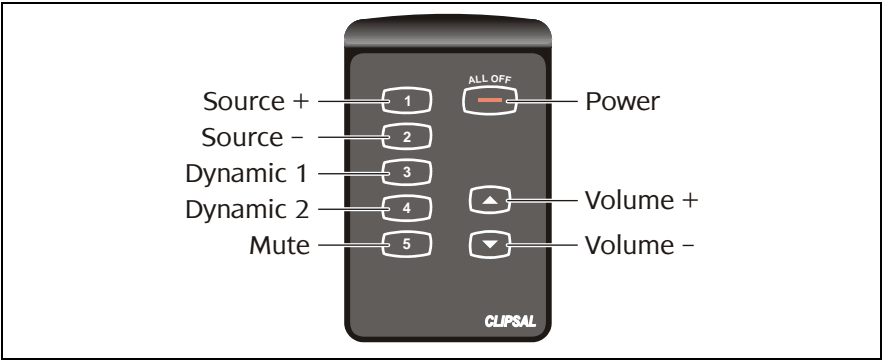

Figure 8 – Button assignments when an Amplifier is configured for the 5035TX

5.0   Reticulated IR

Multi Room Audio Amplifiers can distribute infrared (IR) remote control signals through to a Matrix Switcher or Distribution Unit. IR is received by IR Targets installed in a wall or ceiling, or plugged directly into a Desktop Amplifier (refer to Figure 9). IR is distributed to Emitters which are plugged into the Matrix Switcher or Distribution Unit, and positioned over the IR receiver of the audio source equipment.

If reticulated IR has been included in your MRA system, you can control your source equipment (such as a CD Player and TV) from any room which is fitted with an MRA IR Target. Simply point the source equipment's IR remote control at an IR Target.

Ceiling mounted (close-up)   **Mounted on a Desktop Amplifier**
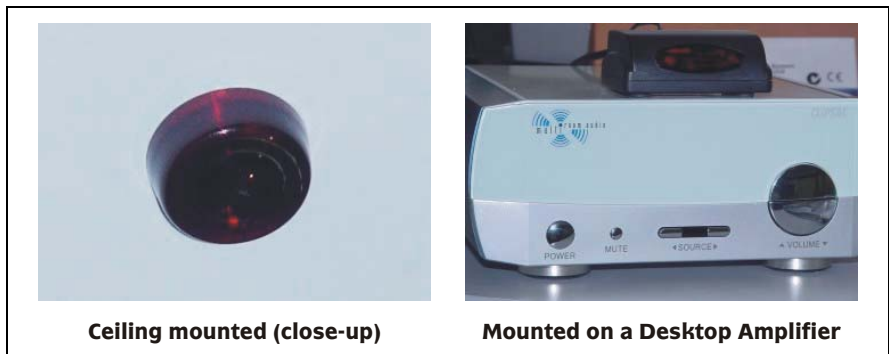
Figure 9 – Example IR targets

6.0   Using Headphones

The MRA Desktop Amplifier has a 3.5 mm stereo headphone socket on its rear panel. This allows you to listen to audio through headphones. In some installations the headphone output may be connected to a wall plate, possibly together with local inputs.

Set the volume to a low level before connecting headphones. Once you have plugged headphones into the Amplifier (either via a wall plate socket or directly into the Amplifier), press the Mute button for more than 400 ms to silence the speakers. Refer to Mute in Section 4.2 (Page 11).

7.0   Local Input

MRA Amplifiers have local input connections on their rear panel in the form of two RCA type sockets (left and right channel). This allows you to connect a local line level audio source to the Amplifier, such as a computer, musical instrument or portable audio player.

In some installations local inputs are wired to a wall plate, for easy access. In such cases alternative connections may be provided (such as a 3.5 mm stereo socket).

The local input accepts audio from the line output of audio equipment. Do not connect higher powered audio signals such as speaker outputs, as this may damage the Amplifier.

8.0   Rear Panel Connections

All connections to the Desktop and Remote Amplifiers are made via the rear panel. Connectors are identified in Figures 10 and 11.
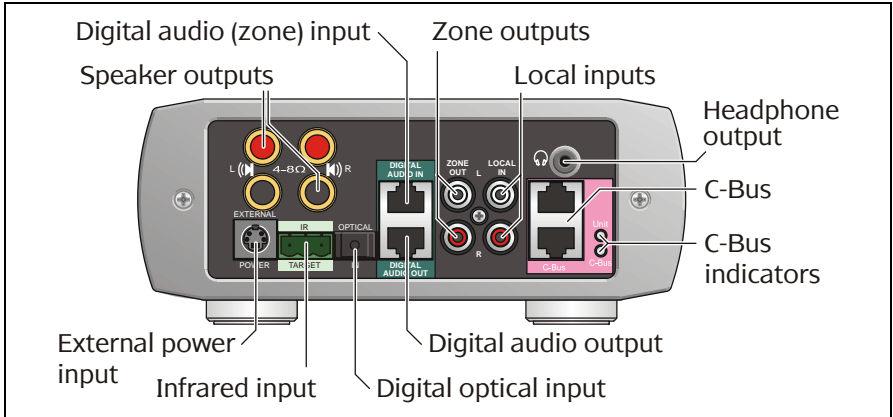

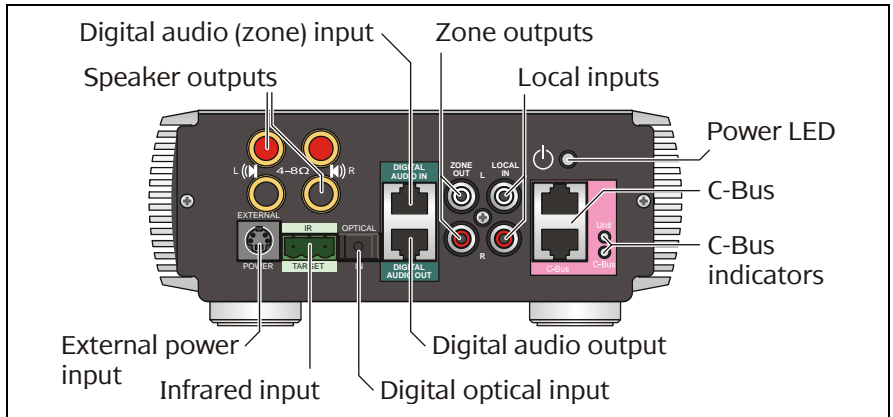Figure 10 – Desktop Amplifier rear panel connectors and indicators

Figure 11 – Remote Amplifier rear panel connectors and indicators

Connection /Indicator	Description
Speaker outputs	These are used to connect to 4 Ω to 8 Ω speakers which are rated at 25 W RMS @ 4 Ω (or 6 W RMS @ 4 Ω if no external power supply is connected to the Amplifier).
Digital audio (zone) input	The zone output of the Matrix Switcher is connected to this input. Alternatively a Multi Room Audio Distribution Unit can be connected to this input, providing one stereo audio input. In this mode, the Amplifier can select between two audio sources: Digital audio input and local input.
Zone outputs (1 × RCA pair)	These are line level outputs of the selected audio source as received by the Amplifier. The outputs are affected by the volume, bass and treble settings of the Amplifier.
Local inputs (1 × RCA pair)	Use this to Connect a local analogue audio source which is available to this Amplifier only.
External power input	This provides power to the Amplifier (when a Matrix Switcher is not used). An external power supply also increases the Amplifier's audio output capacity to 25 W RMS into 4 ohm speakers. Power supply rating: 24 V DC, 3.75 A or 21 V AC, 3.5 A.
Infrared input	This Phoenix socket connects to an IR Target, allowing an infrared remote to control equipment located near the Matrix Switcher. Refer to the Multi Room Audio System Installation Instructions for pinouts.

Connection /Indicator	Description
Digital optical input	Use this to connect a digital optical audio source to the Amplifier instead of the digital audio (zone) source. The digital audio format must be 44.1 or 48 kHz stereo. Some digital audio formats (such as surround sound) are not compatible with the Amplifier. **Either a digital audio (zone) or digital optical audio source may be connected to the Amplifier, but not both simultaneously.**
Digital audio output	This is used to connect an additional Amplifier to the same zone as this Amplifier. A Cat-5 cable is used to connect to the additional Amplifier's Digital audio (zone) input. Both Amplifiers will use the same zone (they will both select the same audio source).
C-Bus (×2)	Connects to the C-Bus network.
C-Bus indicators	Unit On: C-Bus network connected Flashing: Data exchange in progress C-Bus On: C-Bus network operational Off: Insufficient C-Bus power or clock Flashing: Insufficient C-Bus power

Table 2 – Amplifier connectors and indicators

9.0   Care Instructions

Note the following precautions when using Multi Room Audio Amplifiers:

- Clean using a soft lint free cloth.
- Do not use chemicals or spray cleaners when cleaning.
- Do not operate with wet hands.
- Do not use hard, sharp objects to select the controls.
- Allow adequate ventilation. Do not cover the unit.
- MRA Amplifiers are designed for indoor use only.
- Keep the unit away from water and other liquids.
- Do not expose the unit to high temperatures.

| no wet hands | no cleaner spray | no coverage | no direct sunshine | no dust |

10.0 Troubleshooting

Symptom	Possible Explanation
There is no sound after switching the Amplifier on (sound worked previously).	The volume may have been set to minimum, or the Amplifier may have been Muted (on a Desktop Amplifier) before the Amplifier was switched off.
The default volume, bass or treble settings have changed (when switching the Amplifier on).	If a power failure occurs when the Amplifier is on, the volume, bass and treble settings are saved and become the new defaults.
A mains circuit breaker trips when Amplifiers are powered up.	This may occur if more than five Amplifier power supplies are connected to the same circuit, due to a high inrush current.
Unexpected behaviour occurs after the digital zone connections are changed.	The Amplifier's zone settings are not reset until all power is removed from the Amplifier. Alternatively use the Reset Amplifier function on the unit's C-Bus Status tab in the C-Bus Toolkit software.
The wrong Amplifier is responding to source changes.	The "Use Matrix Switcher auto assigned zone" option may not be enabled. This option is in the Amplifier's Zoning tab in the C-Bus Toolkit software. After changing the status of this option (on a live network), use the Reset Amplifier function on the C-Bus Status tab.

Symptom	Possible Explanation
Dynamic labels don't work on a C-Bus DLT wall switch.	There are several options which need to be selected for labels to function. These options are located: · on the More panel accessed by clicking the "More...." button on the Amplifier's C-Bus Control tab in Toolkit · on the DLT wall switch's Global tab in Toolkit · on the Zones branch of the Project tree in the MARPA software.
An Amplifier switches off, particularly when the volume is loud.	If insufficient current is available for the Amplifier, it will switch itself off. This may occur if the Amplifier receives its power from a Matrix Switcher. The Amplifier may need its own external power supply unit.
An Amplifier emits a high pitched screeching sound when a particular source is selected.	This may occur if an output of an Amplifier is connected to the input of the Matrix Switcher. Such a connection should be avoided as it can cause a feedback loop.
Audio is not broadcast via the Matrix Switcher's high priority (HI) broadcast input.	The level of the audio connected to the broadcast input may not be sufficient to trigger the broadcast.
Cannot hear any sound when using the optical input	Some digital audio formats (such as surround sound) are incompatible with the MRA system.

11.0 Electrical Specifications

11.1 Amplifiers

Parameter	Description
Supply Voltage	27 V DC (powered by Matrix Switcher via digital audio connection), and/or 24 V DC @ 3.75 A (via external switch mode power supply) or 21 V AC @ 3.5 A (via external linear power supply)
C-Bus supply voltage	15 to 36 V DC @ 22 mA
Power consumption	90 W maximum
Network clock and burden	Software selectable
Analogue input signal level (Local inputs)	2.8 V p-p maximum (47 k Ω)
Maximum power output	28 W RMS into 4 Ω (0.514% THD)
D/A conversion	16 bit PCM
Frequency response	40 Hz to 20 kHz (±1 dB)
Total harmonic distortion (1 kHz, 20 W RMS into 4 Ω)	0.36% (using analogue input)
Signal to noise ratio	> 67 db (peak, unweighted)
Operating temperature	Desktop Amp.: 10 to 40 °C (50 to 104 °F) Remote Amp.: 10 to 70 °C (50 to 158 °F)
Operating humidity	10 to 90% RH (non-condensing)

11.2 System Audio Performance

Parameter	Description	
	Matrix Switcher + Amplifier*	**Distribution Unit + Amplifier*†**
Frequency response	40 Hz to 20 kHz (+2.4/−0.75 db)	40 Hz to 20 kHz (±2.3 dB)
Total harmonic distortion (1 kHz, 20 W RMS into 4 Ω)	0.16%	0.20%
Signal to noise ratio	> 63 dB (peak, unweighted)	> 63 dB (peak, unweighted)

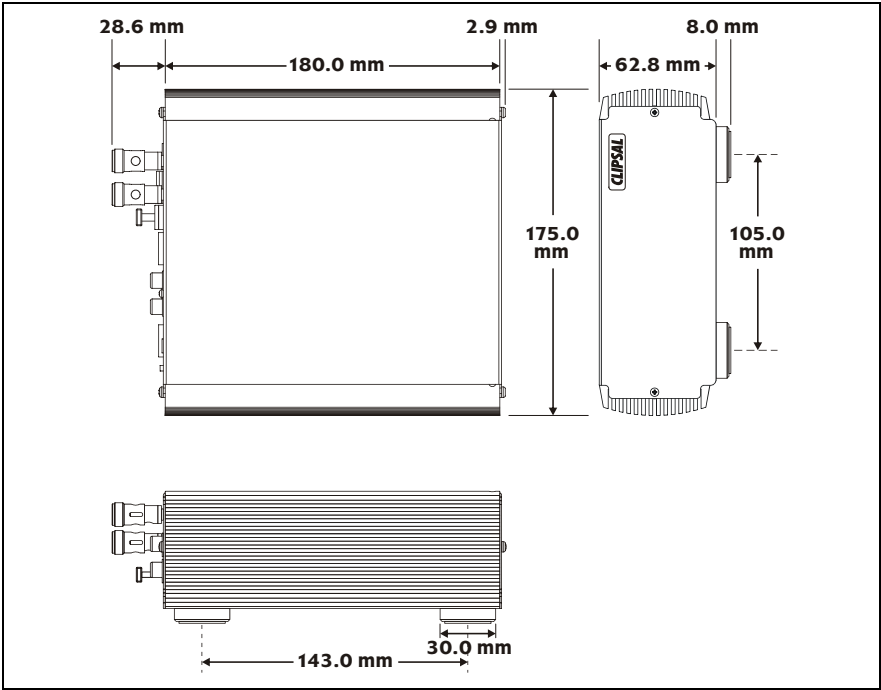* Analogue inputs of Matrix Switcher/Distrib. Unit, measured from Amplifier speaker outputs
† Amplifier powered by an external switch mode power supply

12.0 Mechanical Specifications

12.1 Desktop Amplifier
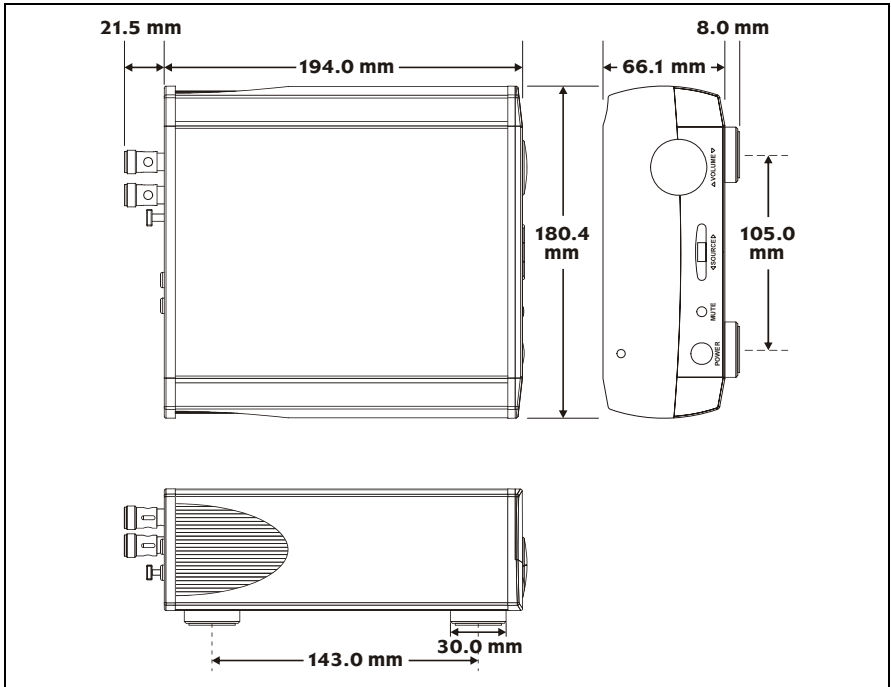
12.2 Remote Amplifier

13.0 Standards Complied

DECLARATIONS OF CONFORMITY

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards
Multi Room Audio Amplifiers comply with the following:

Regulation	Standard	Title
Electrical Safety (When powered by PAC090M Power Supply)	AS/NZS 60065	Audio, video and similar electronic apparatus - Safety requirements
EMC (When powered from Matrix switcher or PAC090M Power Supply)	AS/NZS CISPR 13	Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics (emissions)

* The Braemac PAC090M power supply (Clipsal Cat. Number 5600P24/3750AU) is certified to:

Safety standards
  IEC 60065 and 60950, EN 60065 and 60950,
  K60950, J60950(H14), CNS 13438 ,
  CAN/CSA C22.2 No's. 60950-1 and 60065-03,
  UL 60065 and 60950-1 (UL file 161451)
EMC standards
  EN 55022, 55024, 61000-3-2 and 61000-3-3

14.0 Warranty

Multi Room Audio Amplifiers carry a two year warranty against manufacturing defects (refer to the Warranty Statement).

CLIPSAL®

multi room audio

C-Bus ENABLED

Multi Room Audio System

Installation Instructions

560011	**Distribution Unit**
560125D	**Desktop Amplifier**
560125R	**Remote Amplifier**
560884	**Matrix Switcher**

V1.0 Dec 2005

Contents

1.0 Product Range

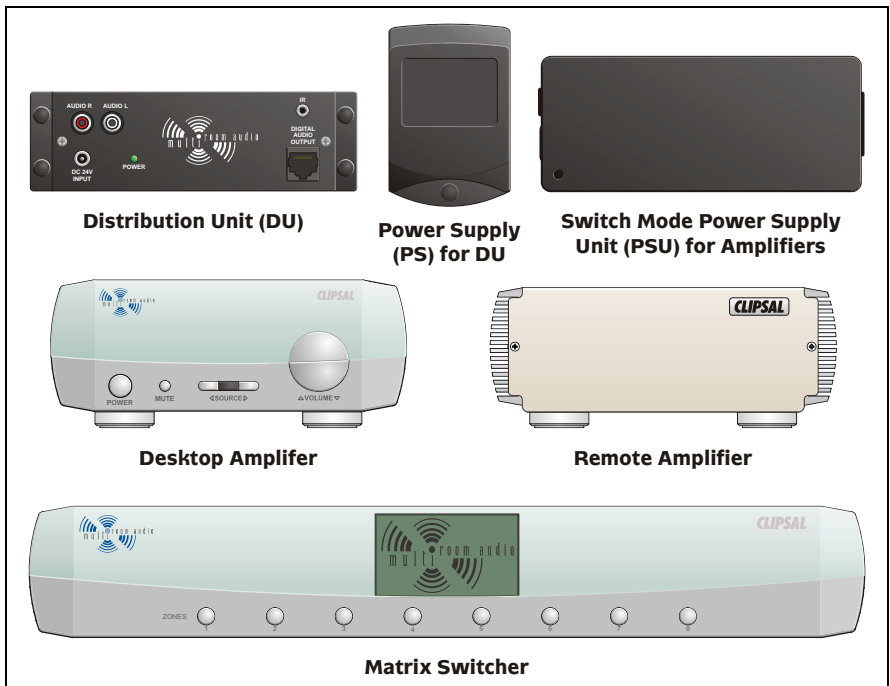| Catalogue Number	Description
560011 560125D 560125R 560884	Multi Room Audio Distribution Unit Multi Room Audio Desktop Amplifier Multi Room Audio Remote Amplifier Multi Room Audio Matrix Switcher
5600P24/500AU 5600P24/3750AU	MRA Distribution Unit Power Supply MRA Amplifier Power Supply Unit

Figure 1 – Multi Room Audio product identification

2.0   Important Notes

·   The Matrix Switcher has a built-in C-Bus power supply. Take this into account when determining the power supply requirement of the C-Bus network.

·   Avoid laying analogue or digital audio cable alongside mains cable, to minimise EMI interference and signal disruption.

·   Do not cover or block the vents on the Matrix Switcher enclosure.

·   The Matrix Switcher and Amplifiers of a particular Multi Room Audio (MRA) system must be connected to the same C-Bus network. Multiple MRA systems may reside on separate C-Bus networks.

·   Only use a Clipsal approved power supply to power an MRA Amplifier or Distribution Unit. Failure to do so may damage the unit, and void the warranty.

·   Units must be installed in accordance with local authority guidelines.

·   The digital audio outputs must only be used with MRA Amplifiers.

3.0   System Overview

The Multi Room Audio Matrix Switcher and Amplifiers provide a C-Bus enabled audio distribution system.

The Matrix Switcher is installed in a room together with audio sources such as a radio tuner, CD player and digital TV set top box. Connections are made to the Amplifiers and to C-Bus.

Amplifiers are installed in each room where audio is to be distributed. They are connected to speakers and the C-Bus network. Using C-Bus switches (or the controls on a Desktop Amplifier), each Amplifier can select different audio sources and adjust the volume, bass and treble.

The Distribution Unit allows a single stereo audio input to be added to the digital input of the Matrix Switcher. It also allows one distributable stereo audio input to be plugged into the Amplifiers when no Matrix Switcher is used (when Amplifiers are used in stand-alone mode).

A typical Multi Room Audio system distributes up to four stereo analogue audio inputs (five if a Distribution Unit is used), and one stereo optical digital audio input. These inputs are distributed to up to 8 zones (each consisting of one or more Amplifiers). A special mono audio input can be

used to broadcast a message to all zones. Additionally each Amplifier is capable of accepting a local stereo audio input, providing up to seven stereo audio channels for each Amplifier.

By adding infrared (IR) targets and emitters to the system, Amplifiers can distribute infrared remote control signals to audio source equipment via the Matrix Switcher. Additionally two buttons on a C-Bus wall switch can be configured to send infrared commands to the audio source equipment; commands which adapt according to which source is selected.

4.0 System Configurations

A Multi Room Audio system can be installed in either a matrix or standalone configuration.

4.1 Matrix

A matrix configuration (Figure 2) consists of a Matrix Switcher which is connected to one or more Multi Room Audio Amplifiers. An Amplifier connected to each zone can select from up to six stereo audio sources plus its local stereo audio input. The audio broadcast and annunciation features of the Matrix Switcher can be utilised in this configuration.
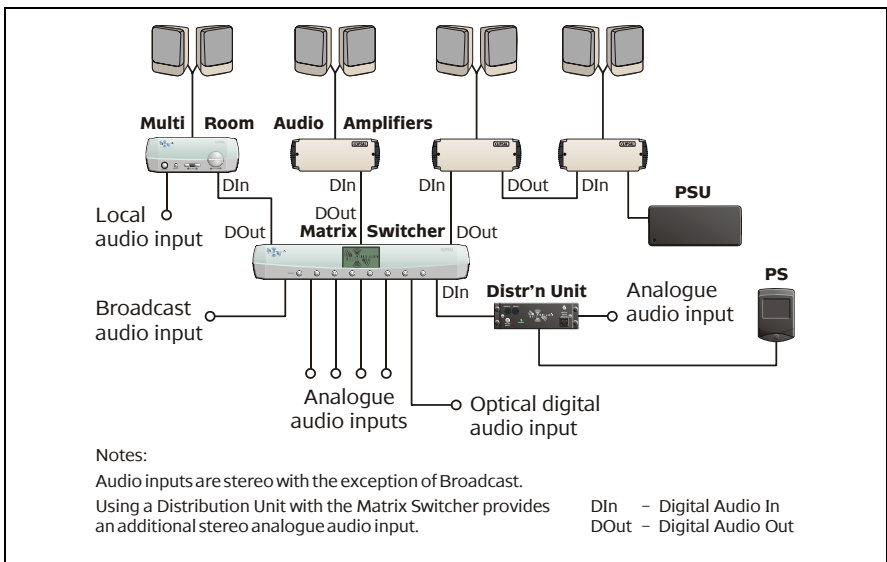

Figure 2 – The matrix confguration

4.2   Standalone

In a standalone configuration a stereo audio source is connected to the input of a Distribution Unit. The output of the Distribution Unit is connected to the digital input of each Amplifier. RJ45 splitters are used to connect all digital inputs to a common Cat-5 cable run. A Matrix Switcher is not used. Up to eight Amplifiers can be connected in this mode using a total cable length of up to 45 m. This is illustrated in Figure 3. Each Amplifier can select between the single distributed stereo audio source and its local stereo audio input.
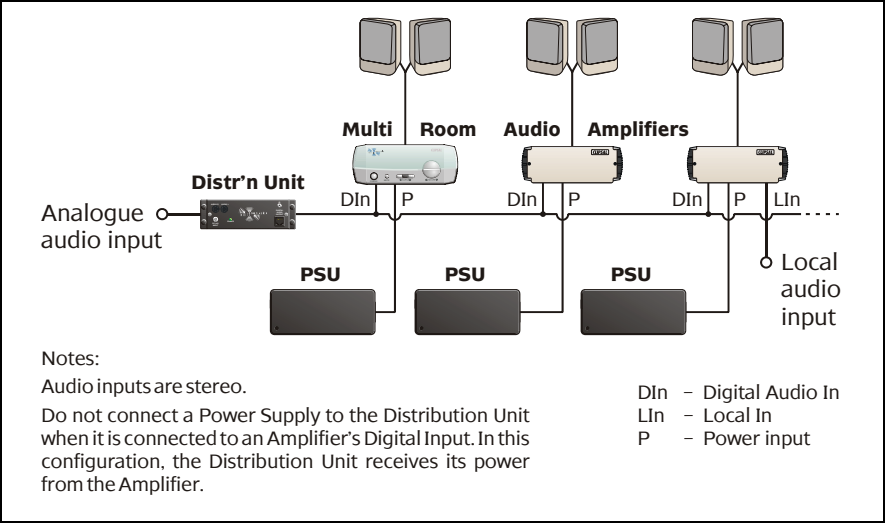

Figure 3 – Standalone configuration

5.0   Installation and Connection

The most time consuming stage of installing a typical Multi Room Audio system is likely to be cabling and wiring. To ensure successful wiring and connection of a Multi Room Audio system:

- Plan – Consider the way the system will be used and create drawings to indicate where terminations will be located.
- Organise – Use wall plate terminations to connect to the Matrix Switcher, Amplifiers and speakers, as well as any local or mono broadcast inputs or headphone outputs. Label the terminations, especially the C-Bus and digital audio sockets which are both RJ45. Consider using colour coded sockets.
- Use appropriate cable.

5.1   Location and Mounting

The Multi Room Audio Matrix Switcher, Distribution Unit, Amplifiers and their associated Power Supplies are suitable for indoor use in moderate to tropical climates. All units must be protected from excessive heat, dampness and liquids.

Matrix Switcher

It is recommended that the Matrix Switcher be located in a central location with the audio source equipment (such as in a cabinet in the lounge room).

Place the Matrix Switcher on a flat surface. Do not remove the feet from the base of the unit as they provide necessary air space. Air must be allowed to flow through vents on the top and base of the Matrix Switcher (by natural convection). Ensure that at least 15 mm of free space is left above the unit, as well as 50 mm at the front of the unit and 75 mm at the rear. This is illustrated in Figure 4.

Ensure that the user will have access to the mains inlet socket after the unit has been installed.

Amplifiers and Switch Mode Power Supply

Suitable locations for Amplifiers may include built-in robes, a pantry or in a ceiling space which is not subjected to high temperature. Alternatively Amplifiers may be located centrally with the Matrix Switcher.

Air must be allowed to flow against the fins on the sides of the Amplifiers (by natural convection). Ensure that at least 50 mm of free space is left at the rear and at each side of the Amplifiers. In addition, leave at least 10 mm of free space at the front of the Desktop Amplifier.

The Switch Mode Power Supply for the Amplifiers has a vent at one end. Leave at least 50 mm of free space in front of this vent. Refer to Figure 5.
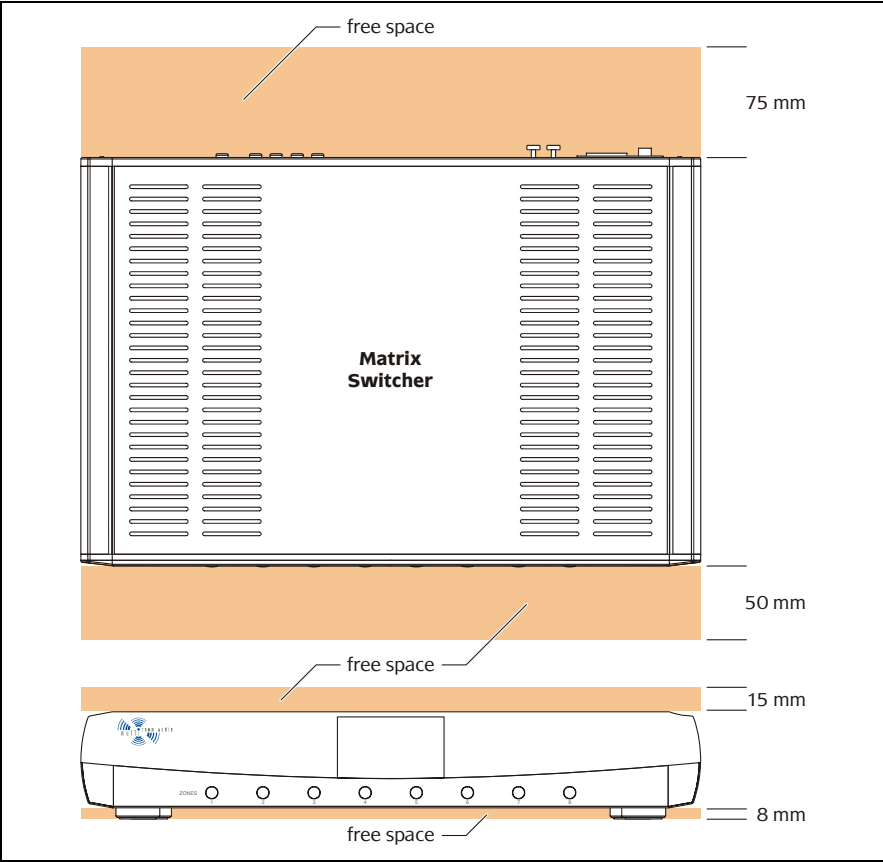
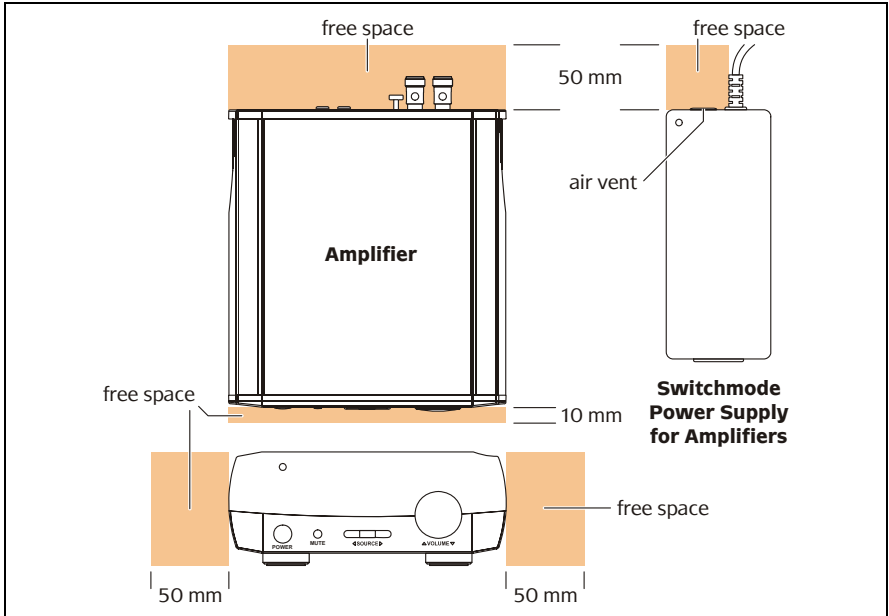Figure 4 – Clearance must be left around the Matrix Switcher

Figure 5 – Clearance must be left around Amplifiers and their Power Supplies

5.2   An Example System

In a Multi Room Audio (MRA) installation, you can locate an Amplifier and speakers in each room where audio is required. You would then run RJ45 cable across the building from the Matrix Switcher to each Amplifier, and run shorter lengths of cable from the Amplifiers to the speakers. Alternatively, you can locate all Amplifiers in a central location and run the speaker cables across the building. In the example used to illustrate an MRA system installation, a combination of these methods is used.

The example system consists of one Matrix Switcher, five Remote Amplifiers and one Desktop Amplifier. Three of the Remote Amplifiers are collocated with the Matrix Switcher. One Remote Amplifier is located on a shelf in the Garage and another in a built-in robe (BIR). The Desktop Amplifier is located on a desk in Bedroom 2 (BR2). Speakers are mounted on walls using appropriate brackets. Wall plates are used in the bedrooms and family room to provide local inputs. These can be used to connect to the audio output of a personal computer (PC) or portable audio player.

On the following pages, diagrams are used to illustrate the C-Bus, speaker, digital audio, IR target and shielded audio stages of the installation.

5.3   C-Bus Cabling

The Amplifiers and Matrix Switcher in a Multi Room Audio system must be connected to a common C-Bus network. Use Cat-5 Unshielded Twisted Pair (UTP) C-Bus cable, and appropriately wired RJ45 plugs and wall plates. Pinouts and cable conductor assignments are provided in Figure 6 and Table 1. Label wall plates to differentiate between other RJ45 connection types (such as Digital Audio and Ethernet). If colour coding, it is suggested you use pink for C-Bus, green for Digital Audio and blue for Ethernet.

Use a C-Bus wall switch (such as Ulti Saturn, Neo or Reflection) to control each zone of the Multi Room Audio system. Switches with Dynamic Labelling Technology (DLT) can be configured to provide visual feedback of selected audio sources. Typically, an individual C-Bus wall switch is used to control both lighting and audio.

In the example installation in Figure 7, Ulti Saturn and Neo wall switches are used in BR2 and BR3 respectively (zones 2 and 3), and DLT wall switches are used to control the remaining Multi Room Audio zones.
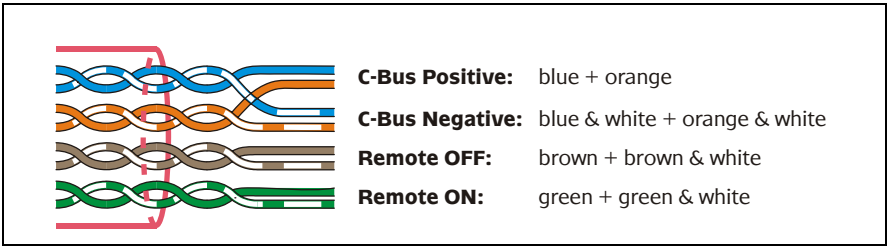

Figure 6 – C-Bus cable conductor assignments

	Pin	C-Bus Connection	Colour
	1	Remote ON	green & white
	2	Remote ON	green
	3	C-Bus Negative (−)	orange & white
	4	C-Bus Positive (+)	blue
	5	C-Bus Negative (−)	blue & white
	6	C-Bus Positive (+)	orange
	7	Remote OFF	brown & white
	8	Remote OFF	brown

Table 1 – RJ45 sockets and C-Bus Pinouts

Figure 7 – C-Bus cabling and termination

5.4   Speaker Cabling

Depending on the installation, speakers may be mounted on a wall using brackets, or flush mounted on a wall or ceiling. When speakers are mounted on brackets, it is recommended that an RCA wall plate is installed adjacent to each speaker.

Spring-release or screw binding post wall plates are used to connect to speaker outputs of the Amplifiers.

Use low impedance speaker cable to connect the binding post (Amplifier) wall plates to the RCA (speaker) wall plates. This is especially important with long cable runs.

Figure 8 illustrates how an RCA wall plate is used to connect a speaker. This is ideal for speakers which have been mounted on walls using brackets, as in the example installation in Figure 9.
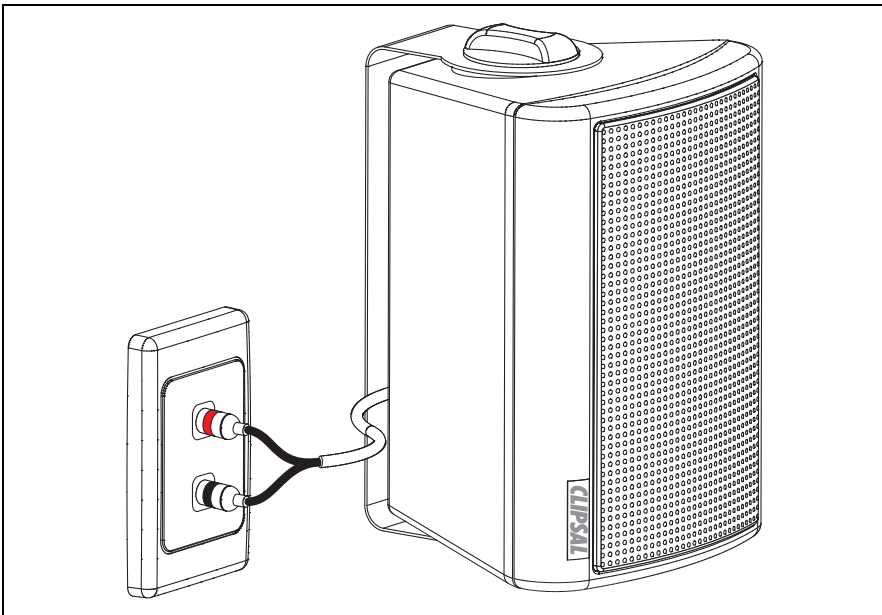
Figure 8 – An RCA wall plate makes a practical speaker connection point
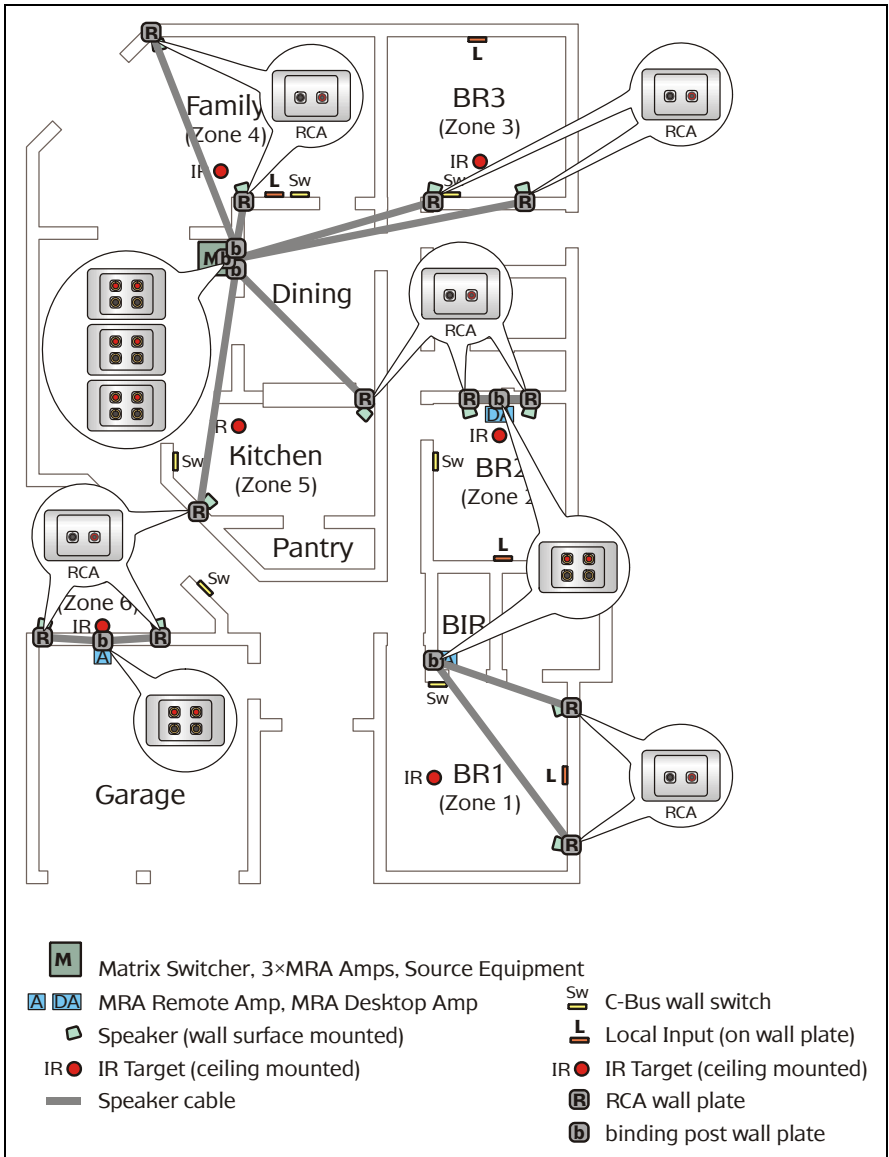
Figure 9 – Speaker cabling and termination

5.5 Digital Audio Cabling

A digital audio cable must be connected between each Amplifier and the Matrix Switcher. Use Cat-5 Unshielded Twisted Pair (UTP) data cable, and appropriately wired RJ45 plugs and wall plates.

Since Cat-5 cable may be used for several purposes within the same installation, it is recommended you use green cable for digital audio connections, pink for C-Bus and blue for Ethernet. Wall plates should be labelled to differentiate between the various RJ45 connection types. Colour coding of sockets is recommended.

Avoid laying digital audio cable alongside mains cable, as electro-magnetic interference (EMI) can disrupt the signal. An individual Cat-5 cable which connects a digital audio output to an input should not exceed 45 metres. This is illustrated in Figure 10.
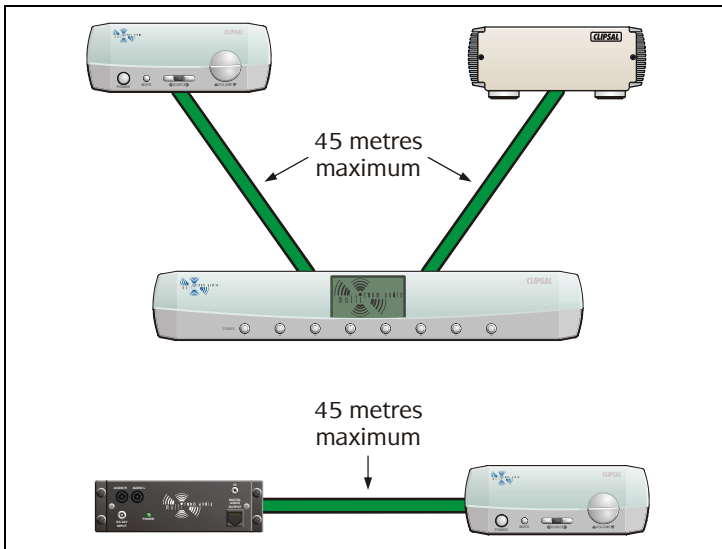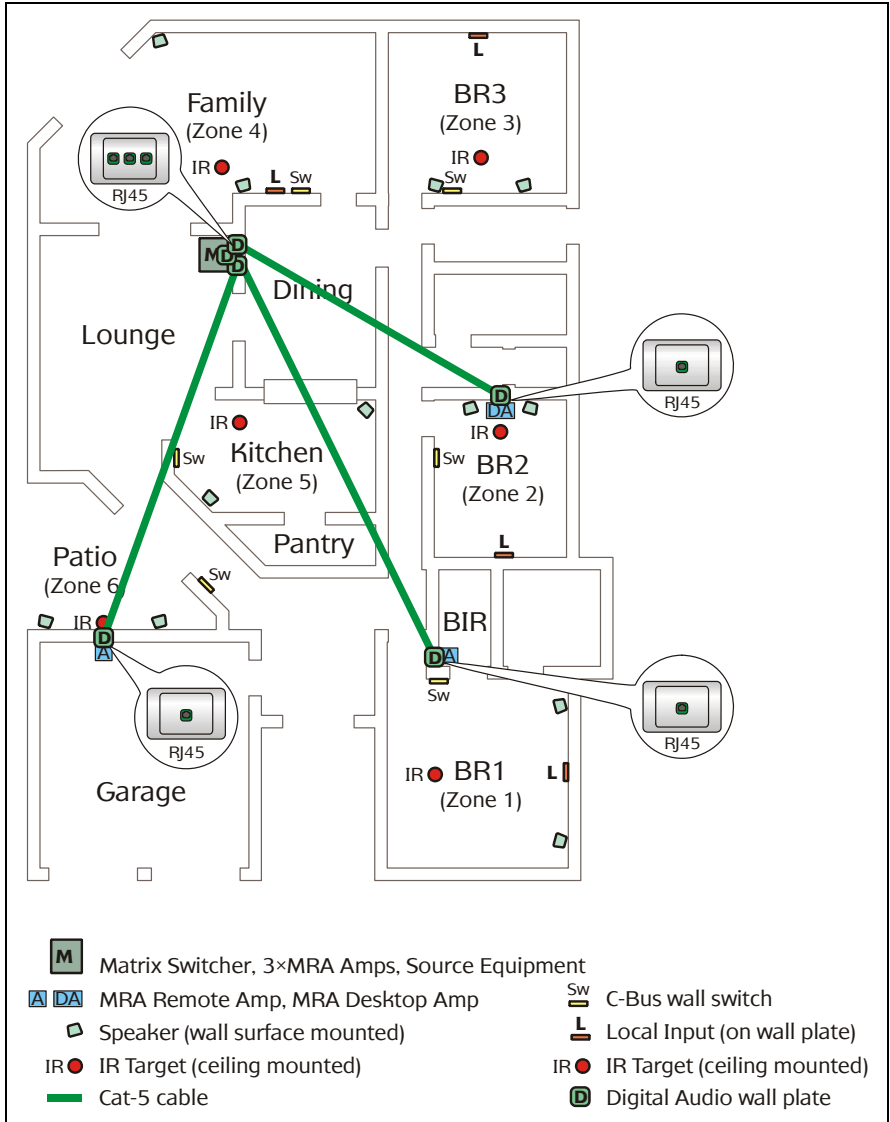

Figure 10 – Maximum digital audio cable length

Figure 11 – Digital audio cabling and termination

5.6   IR Target Cabling

An infrared (IR) target can be connected to the green Phoenix socket on the rear of each Amplifier. This allows an IR remote control to operate audio source equipment which is fitted with IR emitters connected to the Matrix Switcher. Figure 12 shows two methods of connecting an IR target to an Amplifier.

A suitable IR target is the Clipsal 8050TT Tube Target mounted on a ceiling or wall (optionally via a wall plate). Extend the cable if required and wire to a 3.5 mm stereo socket on a wall plate adjacent to the Amplifier. Up to 45 m of total cable may be used between a target and the Matrix Switcher (or Distribution Unit in standalone mode). Create a lead to connect the Amplifier IR input to the 3.5 mm wall plate socket.

A Clipsal 8050ST Shelf Top Target can be mounted on top of a Desktop Amplifier and plugged directly into the IR input on its rear panel.

NOTE IR signals received by external IR targets cannot directly control the Amplifiers. Such control is accomplished via the IR receiver built into the front panel of the Desktop Amplifier.
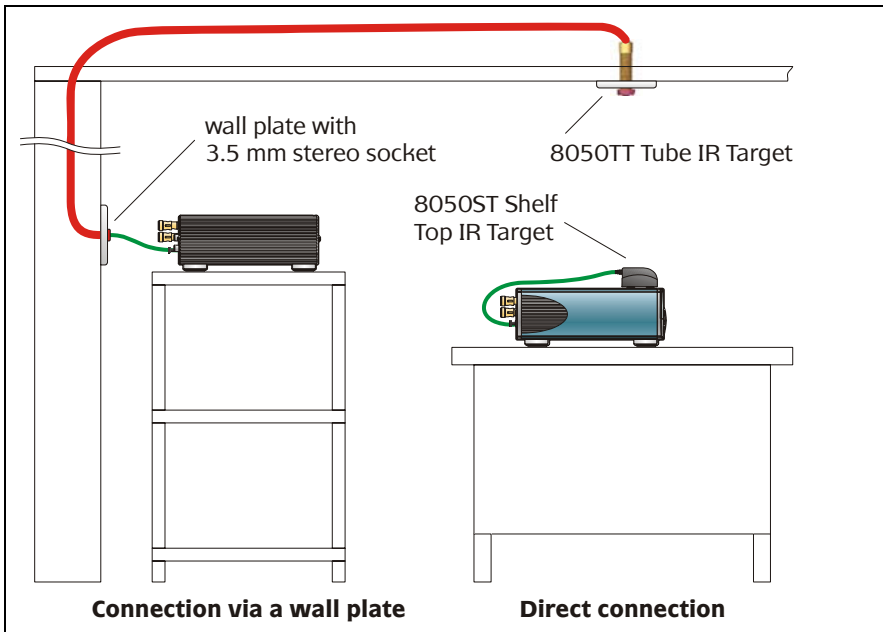

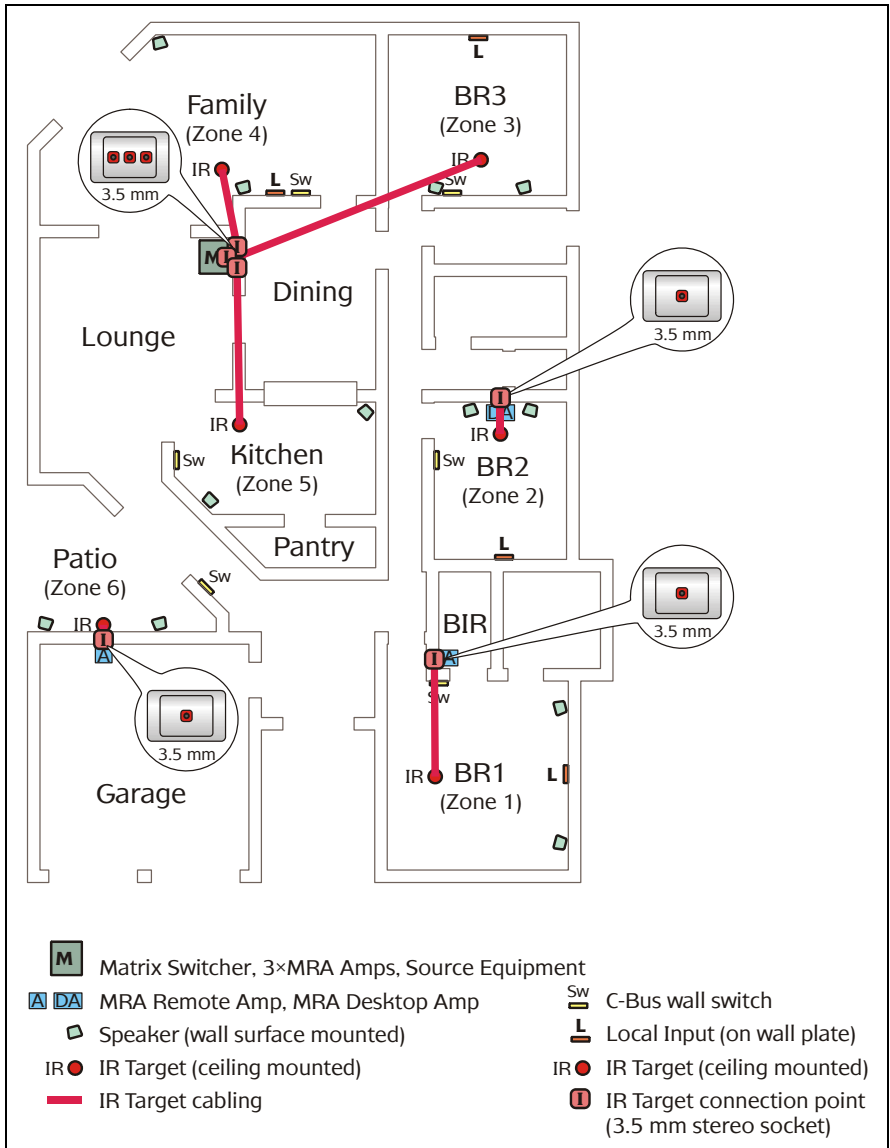Figure 12 – Connecting an IR target to an Amplifier

Figure 13 – IR target cabling and termination

The example installation in Figure 13 uses ceiling mounted Clipsal 8050TT Tube Targets for Remote and Desktop Amplifiers.

5.7   Shielded Audio Cabling

Multi Room Audio Amplifiers have line level local audio inputs (LOCAL IN), which can be used to play audio from a locally connected music player or PC. Amplifiers also have volume affected line level audio outputs (ZONE OUT) which can be connected to other audio equipment. The Desktop Amplifier has a headphone output. These inputs and outputs should be cabled and terminated if they are to be utilised.

It is recommended that wall plates with appropriate audio sockets be used to provide input and output connection points to the Amplifier. Use RCA sockets at the Amplifier end for local inputs and line outputs. Use 3.5 mm stereo sockets at the other end to provide the connection points for external audio equipment. Use 3.5 mm stereo sockets for headphone connections.

When installing audio cable:

- · wire wall plates with suitably shielded stereo audio cable
- · avoid laying audio cable alongside mains cable to minimise EMI pickup
- · do not earth audio ground terminals.

Cabling and wall plate requirements for the example installation are illustrated in Figure 14.
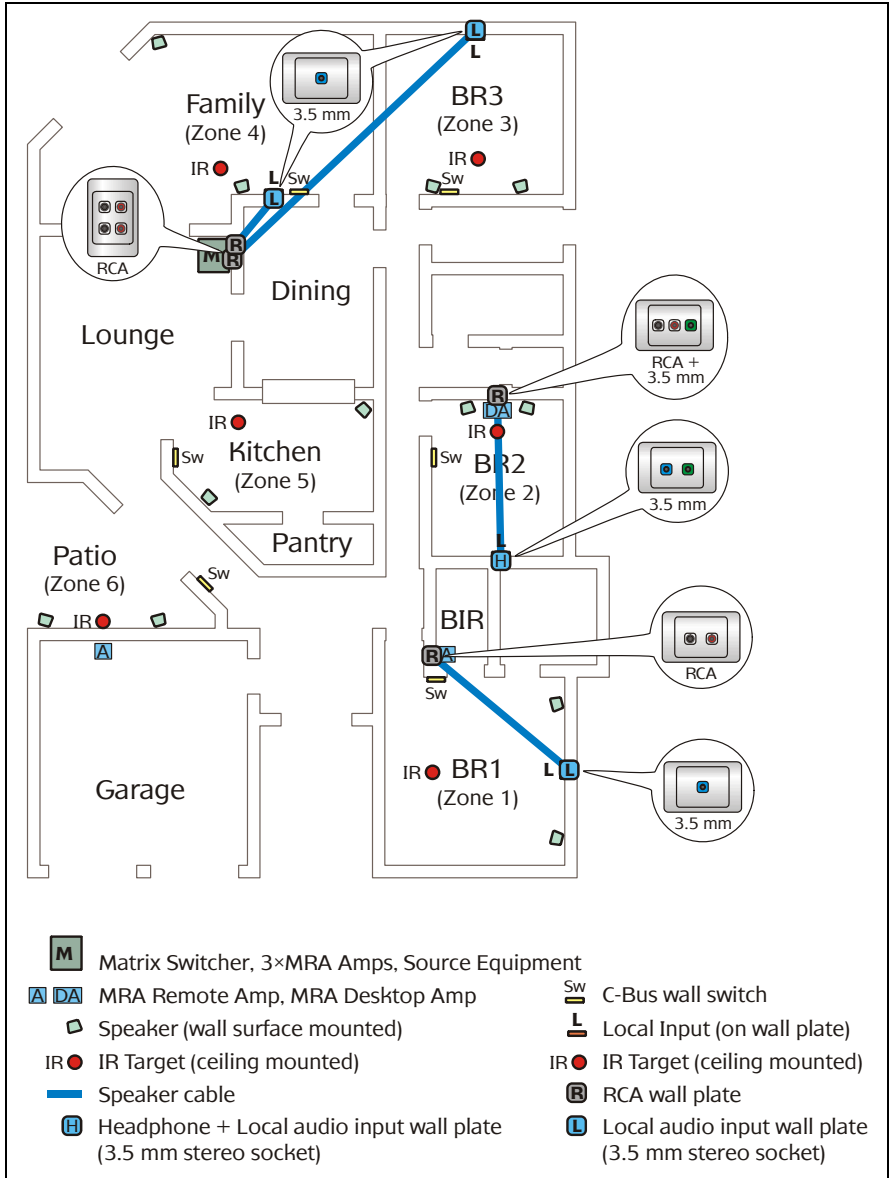
Figure 14 – Shielded audio (local input/headphone output) cabling & termination

5.8   Connecting Multi Room Audio Units

Once wall plate connections have been installed and cabled and speakers have been connected, you are ready to connect the Multi Room Audio Amplifiers and Matrix Switcher.

Figures 15 to 17 show the connection of Amplifiers for zones 1, 2 and 6 of the example system. Figure 18 shows the connection of Amplifiers for zones 3, 4 and 5 (which are centrally located), and for the Matrix Switcher.

Unit connections are identified on Page 53. Descriptions of the front panels are provided in the Amplifier and Matrix Switcher User's Guides.
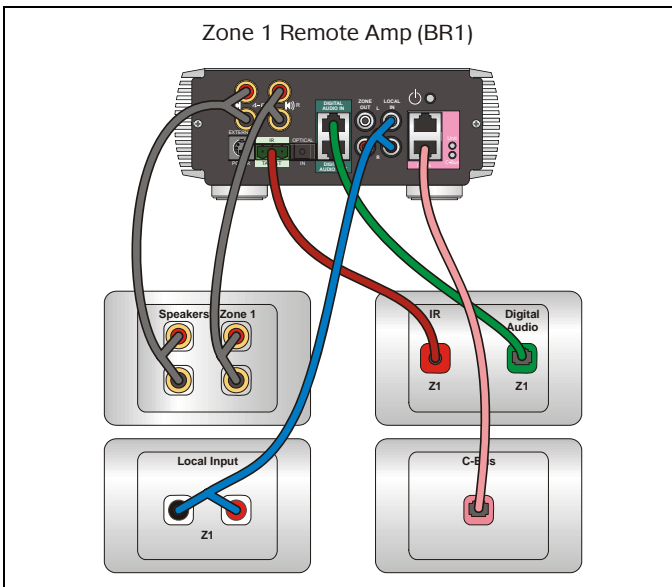
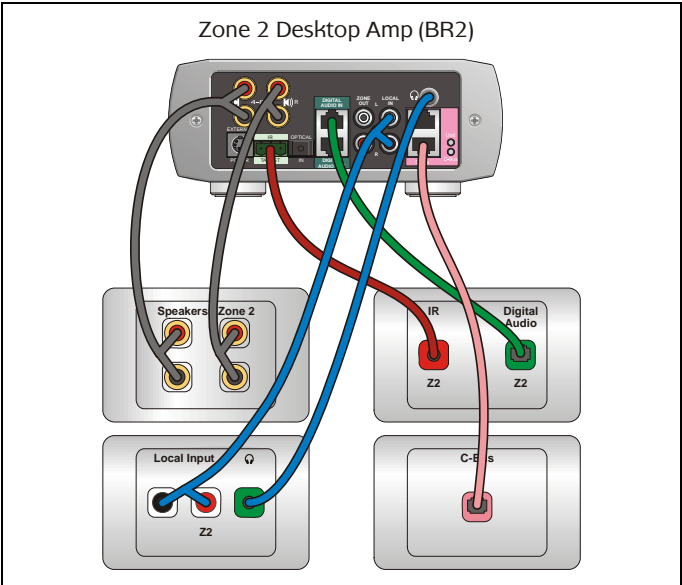Figure 15 – Zone 1 Amplifier connections
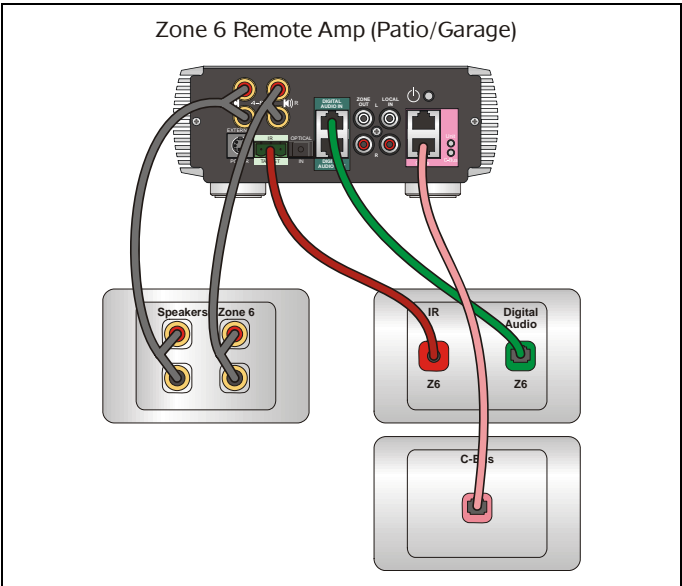
Figure 16 – Zone 2 Desktop Amplifer connections
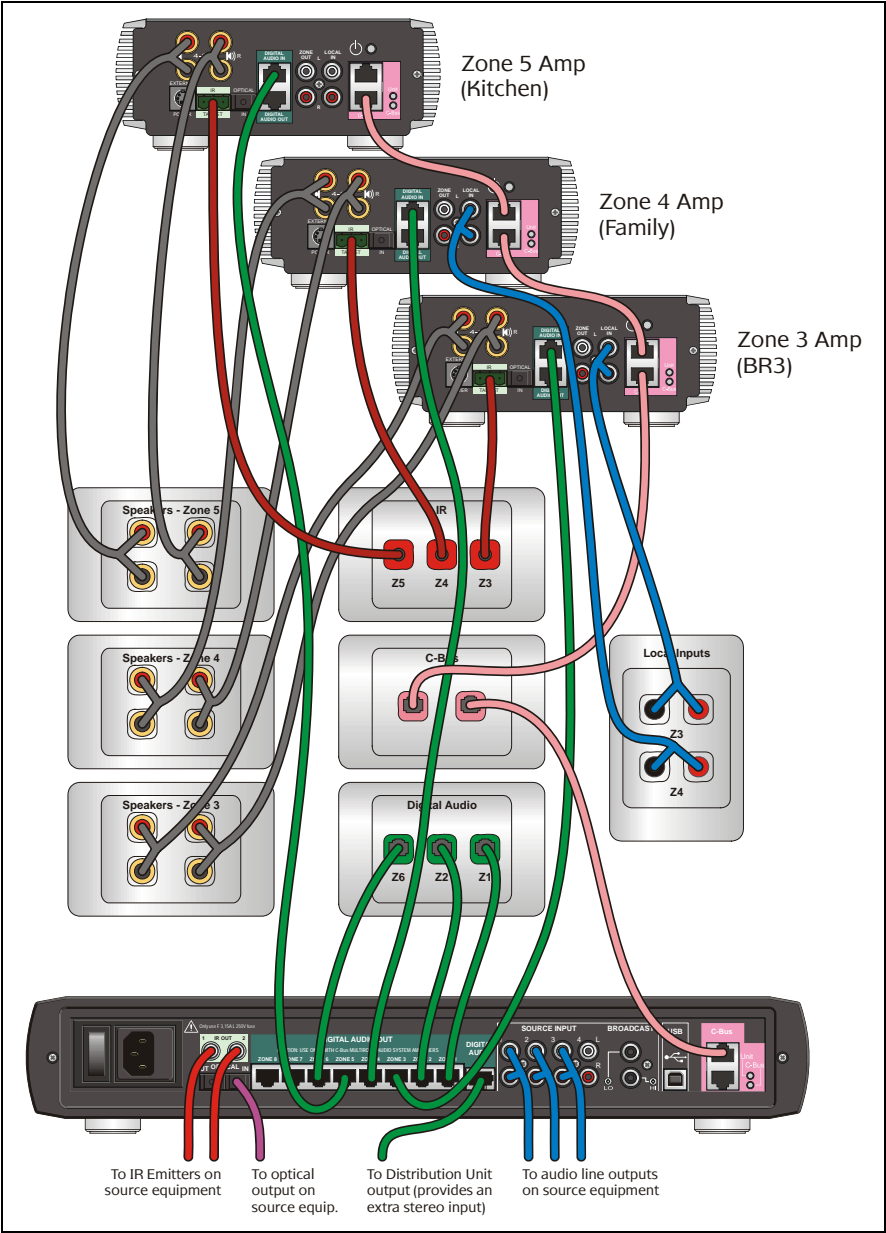

Figure 17 – Zone 6 Amplifier connections

Figure 18 – Matrix Switcher and Zone 3 to 5 Amplifier connections

6.0   C-Bus System Clock

The Multi Room Audio Matrix Switcher and Amplifiers incorporate a software selectable C-Bus system clock. The system clock is used to synchronise data communication over a C-Bus network. At least one active C-Bus system clock is required on each C-Bus network for successful communication. No more than three units on any C-Bus network should have clock circuitry enabled, so this option is normally disabled using the C-Bus Toolkit software.

If a system clock is required, it can be enabled when editing the unit in the C-Bus Toolkit software.

7.0   C-Bus Network Burden

The Multi Room Audio Matrix Switcher and Amplifiers incorporate a software selectable network burden. The network burden can be enabled when editing the unit in the C-Bus Toolkit software, but only if the C-Bus system clock is also enabled.

One network burden is normally required to ensure correct operation of each C-Bus network. The Network window of a C-Bus Toolkit project provides a summary of a C-Bus network according to the units added to the Database. This can be helpful in determining how many burdens are required on a particular network.

8.0   C-Bus Power Requirements

The Matrix Switcher has a built-in C-Bus Power Supply which provides 330 mA to the C-Bus network. Multi Room Audio Amplifiers draw 22 mA from the C-Bus network.

The Matrix Switcher supplies enough C-Bus power for at least seven Multi Room Audio Amplifiers and seven C-Bus wall switches (such as the Ulti Saturn or DLT).

The Distribution Unit does not connect to C-Bus and therefore does not impact on the power requirements of a C-Bus network.

The Network window of a C-Bus Toolkit project provides a summary of a C-Bus network according to the units added to the Database. This can be helpful in determining the power supply requirements of a particular network.

9.0   Power Surges

External power surge protection devices should be used to enhance system immunity to power surges. It is strongly recommended that overvoltage protection equipment such as the Clipsal 970 Series be installed at the switchboard.

10.0 Programming and Setup

Once a Multi Room Audio (MRA) system has been installed, it must be configured using the C-Bus Toolkit software and the Multi Room Audio Rapid Programming Application (MARPA).
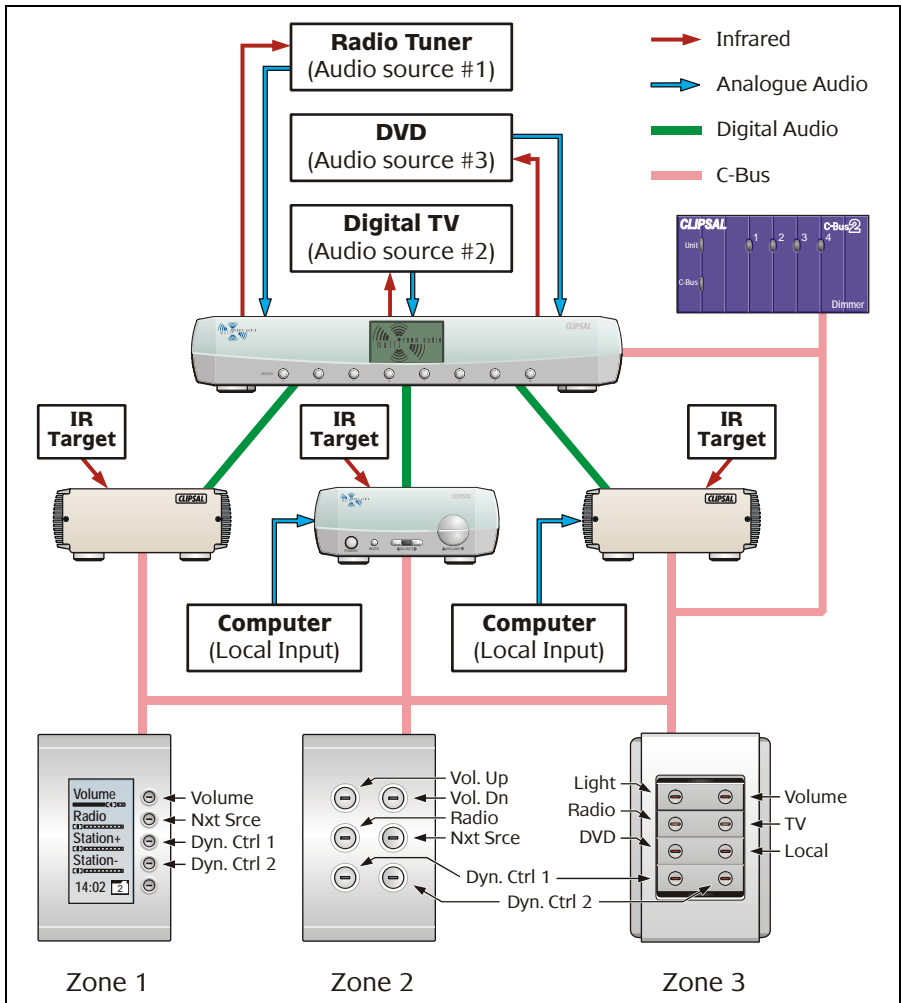

Figure 19 – Example system to be configured by software

It is highly recommended that you complete a C-Bus Training Course before configuring a Clipsal Multi Room Audio system. Sections 10.1 and 10.2 take you through the configuration process. These sections assume you are familiar with the C-Bus Toolkit software. They use the example system shown in Figure 19. This system consists of three zones and uses the following units (all on the same C-Bus network):

    1 × Matrix Switcher

    2 × Remote Amplifiers

    1 × Desktop Amplifier

    1 × Ulti Saturn DLT wall switch

    1 × 6 button Ulti Saturn wall switch

    1 × 8 button Neo wall switch

    1 × radio tuner (audio source #1)

    1 × digital TV set top box (audio source #2)

    1 × DVD player (audio source #3)

    1 × 4 Channel Dimmer.

10.1   C-Bus Toolkit

C-Bus programming is accomplished using the C-Bus Toolkit software. It involves:

- creating a C-Bus project with a Group Address structure which is used by MRA Amplifiers and the MARPA software
- enabling a C-Bus system clock and burden in the Matrix Switcher (if required)
- configuring each MRA Amplifier so it can be controlled by one or more C-Bus wall switches.

1) Start Toolkit, and create a new C-Bus project and network for the MRA system. If a project and network already exist (such as when you are adding to an existing C-Bus network), open that project and network.

2) Decide which Application you will use for the MRA system. You may create a unique Application (such as "Lighting/Audio" Application Address 55). However, if you use C-Bus wall switches to control both lights and audio, both need to use the same Application Address. In this case it may be best to use the default "Lighting" Application Address 56.

3) Create the Group Addresses. These are used to associate buttons on wall switches or a touch screen with Amplifier control functions such as volume and source selection. For each Amplifier, create a Group Address for each of the following that will be controlled from a C-Bus device:

· Volume

· Bass

· Treble

· Next Source

· Previous Source

· Absolute Source (used in combination with a selector)

· Dynamic 1

· Dynamic 2.

It is suggested you use clearly identifiable tag names/descriptions when you create the Group Addresses. Suitable Groups for the example MRA system in Figure 19 are shown in Figure 20.
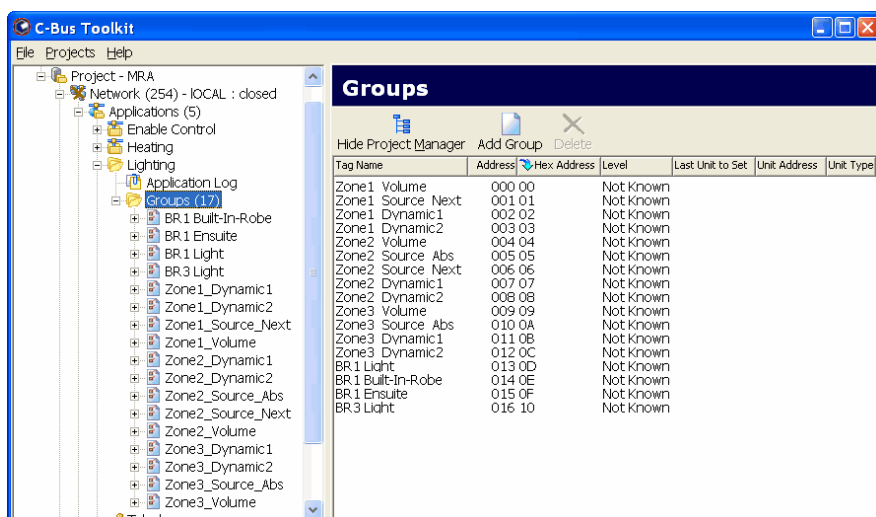
Figure 20 – Group Addresses used in the example MRA system

4) A button on a wall switch can be used to select a specific audio source (absolute source). This is normally achieved by configuring the button as a scene. If you program a C-Bus DLT wall switch to select an absolute source, you must create a Group Address in the Trigger Control Application and an Action Selector (selector) for each scene. These allow you to send labels to the DLT scenes. Such a Trigger Control Group Address with selectors is shown in Figure 21.
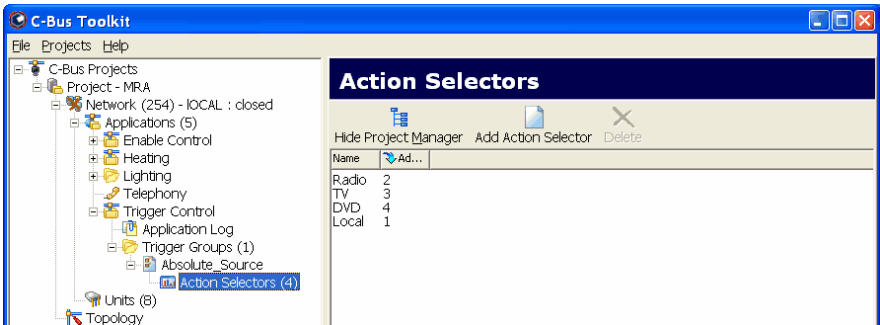

Figure 21 – Selectors used in DLT scenes for absolute source selection

5) Two dynamic control buttons can be used on a wall switch to perform different functions depending on which source is selected. If you use dynamic control buttons you must create a Group Address in the Trigger Control Application and a selector for each function. These selectors are used when configuring the Matrix Switcher with the MARPA software. A Trigger Control Group Address with selectors used in the example MRA system is shown in Figure 22.
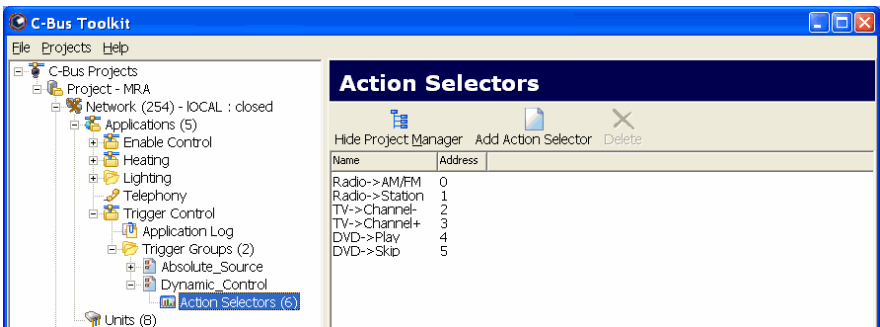
Figure 22 – Selectors used for the dynamic control functions

6) Select the Units branch of the C-Bus Toolkit tree view and add the C-Bus units to the network. Figure 23 shows C-Bus Toolkit after adding the units used in the example MRA system. Added units consist of:

  1 × MRA Matrix Switcher

  3 × MRA Amplifiers
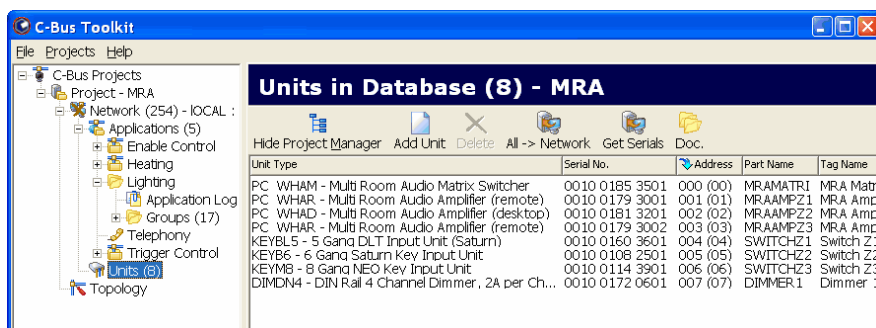
  3 × C-Bus wall switches

  1 × DIN Rail Dimmer.

Figure 23 – Units added to the network in the MRA project

7) Configure the Matrix Switcher unit (if necessary). The Matrix Switcher needs to be configured in Toolkit only to enable its C-Bus system clock or network burden. In a C-Bus network consisting entirely of MRA devices, or where the Matrix Switcher is the only unit with a C-Bus power supply, it is recommended that you enable the Matrix Switcher's C-Bus system clock and burden. This is shown in Figure 24.
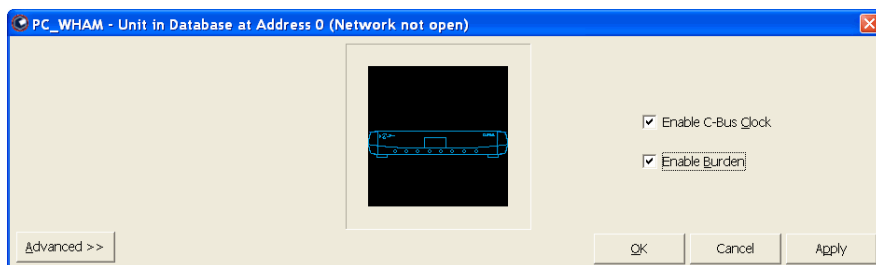
Figure 24 – Enable the Matrix Switcher's C-Bus clock and burden

8) Configure the Amplifiers. In a typical MRA system such as in Figure 19 the default settings on the Audio Levels and Zoning tabs are sufficient. The Remote tab (Desktop Amplifier) is configured by default to use the remote control supplied with the Desktop Amplifier.

The C-Bus Control tab must be configured in order to control an Amplifier from a C-Bus wall switch. Select the Application first. Then specify which Group Addresses will be used to control the Volume, Bass and Treble, the Next, Previous and Absolute Sources, and the Dynamic controls. Use the Group Addresses you created in Step 3.

Figures 25 to 27 show the configurations for the Amplifiers in the example MRA system.
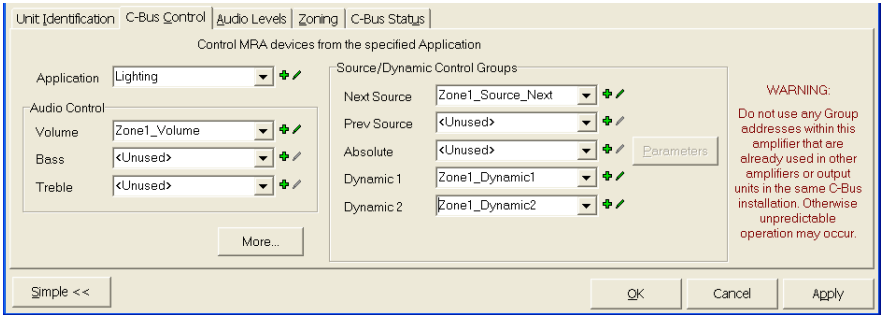
Figure 25 – The C-Bus Control tab for the Zone 1 Remote Amplifier
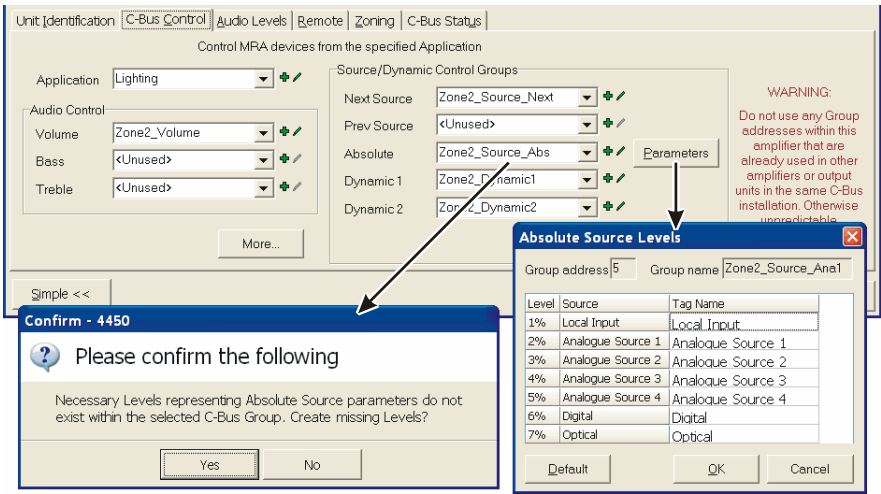
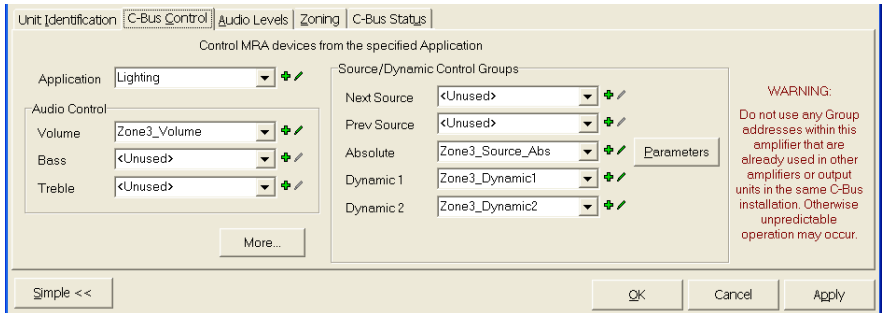Figure 26 – The C-Bus Control tab for the Zone 2 Desktop Amplifier

Figure 27 – The C-Bus Control tab for the Zone 3 Remote Amplifier

☞ NOTE The Absolute source is used to select a specific audio source, such as Analogue Source 1 or Local Input. It consists of a Group Address and a selector (level). When selecting an Absolute Group Address, you are asked if you want to create levels for the selected Group Address. After responding with Yes, you can click the Parameters button to see which levels are used to select specific audio sources. This is shown in Figure 26. The same levels are always used for the respective sources.

9) Configure the wall switches. For most control functions you simply select the Group Address and function type. It is recommended you use the following functions:

· Bell Press for Next and Previous Source
· On/Off for Dynamic control
· Scene for Absolute Source selection
· Dimmer for a single Volume button, Dimmer Down/Dimmer Up for a pair of Volume buttons
· Dimmer for a single, or Dimmer Down/Dimmer Up for a pair of Bass or Treble buttons. Use a short release recall level of 50% so that a quick-press sets the bass or treble to mid range. Do this via the Key Function and Blocks tabs (refer to Figure 28).
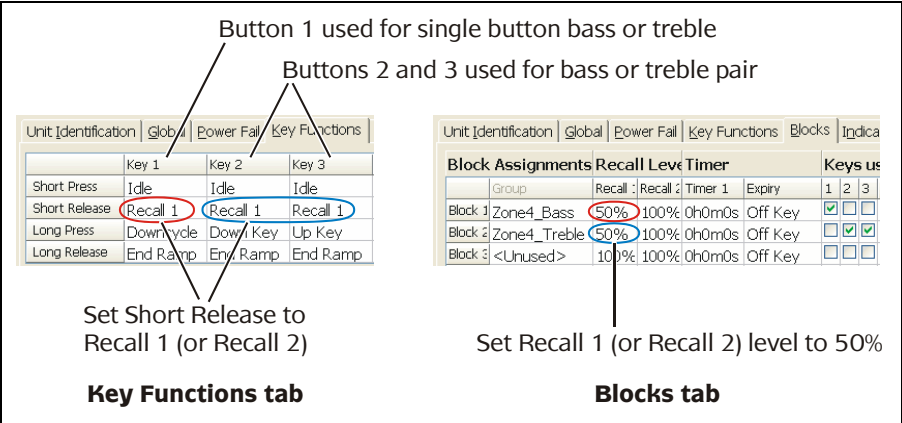
Figure 28 – Setting short release recall levels for bass and treble buttons

Figure 29 shows configuration of the C-Bus DLT wall switch used in Zone 1 of the MRA example system.
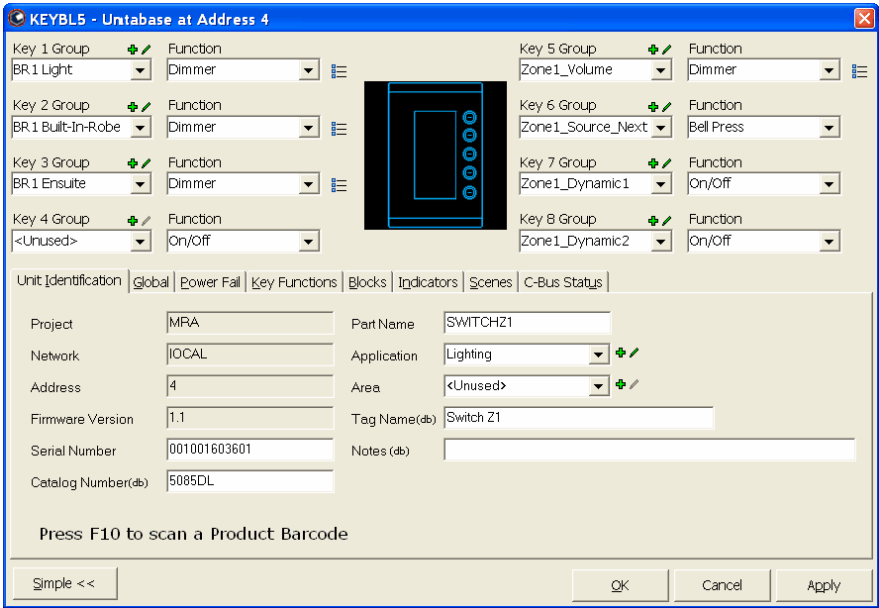

Figure 29 – Configuring the C-Bus DLT wall switch for Zone 1

Absolute Source selection is a little more complicated, as it is best performed using a scene. To configure a button that selects an absolute source using a scene:

i) Select the Scene function for the button. (Note that a button is referred to as a key in some versions of Toolkit).

ii) Click the ⊞ Properties button next to the Function. This brings up the "Define a Scene" panel. If you are using a C-Bus DLT wall switch, you must select a Trigger Group and Trigger Group Action Selector on this panel so you can send labels to the DLT later. Use the Group Address and selector(s) you created in Step 4. An example is provided in Figure 30.

iii) Click the Edit Scenes button to bring up the Scene Manager. Select the Group Address used for Absolute Source selection (from the list on the right hand side), and click the "<" button to add it to the list of Commands. Type the level which corresponds to the relevant source, in the box next to the slider. Absolute source levels can be seen in Figure 26.

Figures 31 and 32 show the configuration of the Ulti Saturn wall switch used in Zone 2 of the MRA example system.
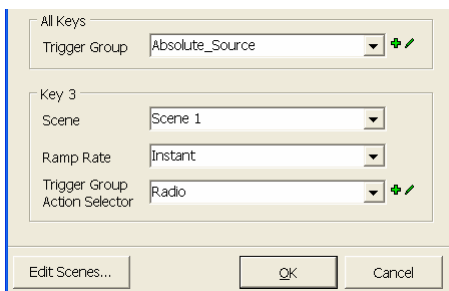

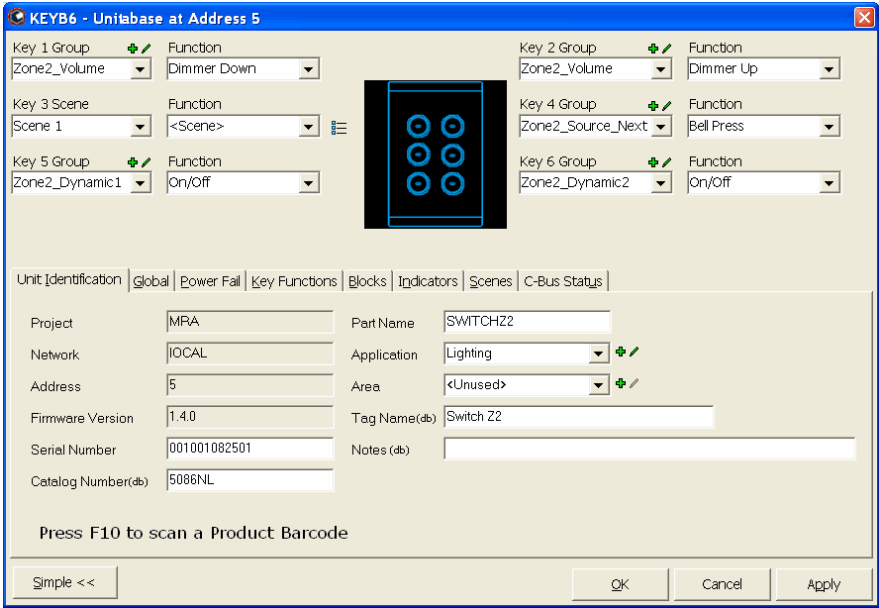Figure 30 – Defining a scene on a DLT

Figure 31 – Configuring the Ulti Saturn wall switch for Zone 2

If a wall switch is programmed with one or more absolute source buttons as well as a next/previous source button, add the next/previous source Group Address(es) to the scene used for absolute source selection. This will force the scene button's indicator to switch off when the next or previous source button is selected. This is shown in Figure 32.
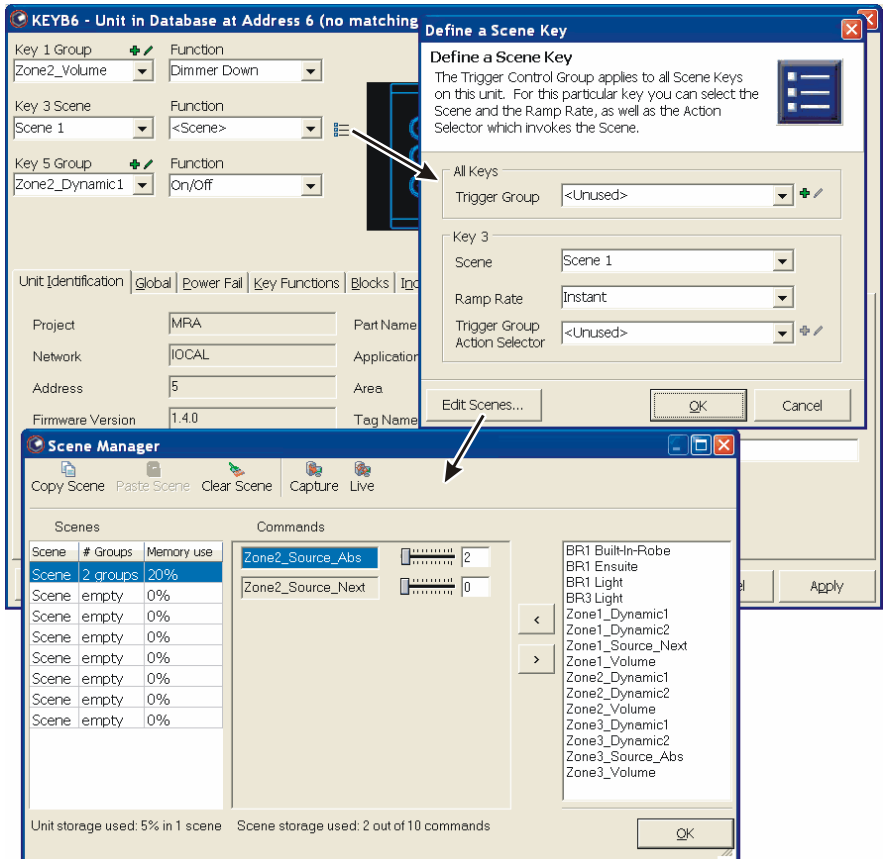
Figure 32 – Configuring a button for absolute source selection for Zone 2

Figures 33 to 36 show the configuration of the Neo wall switch used in Zone 3 of the MRA example system.
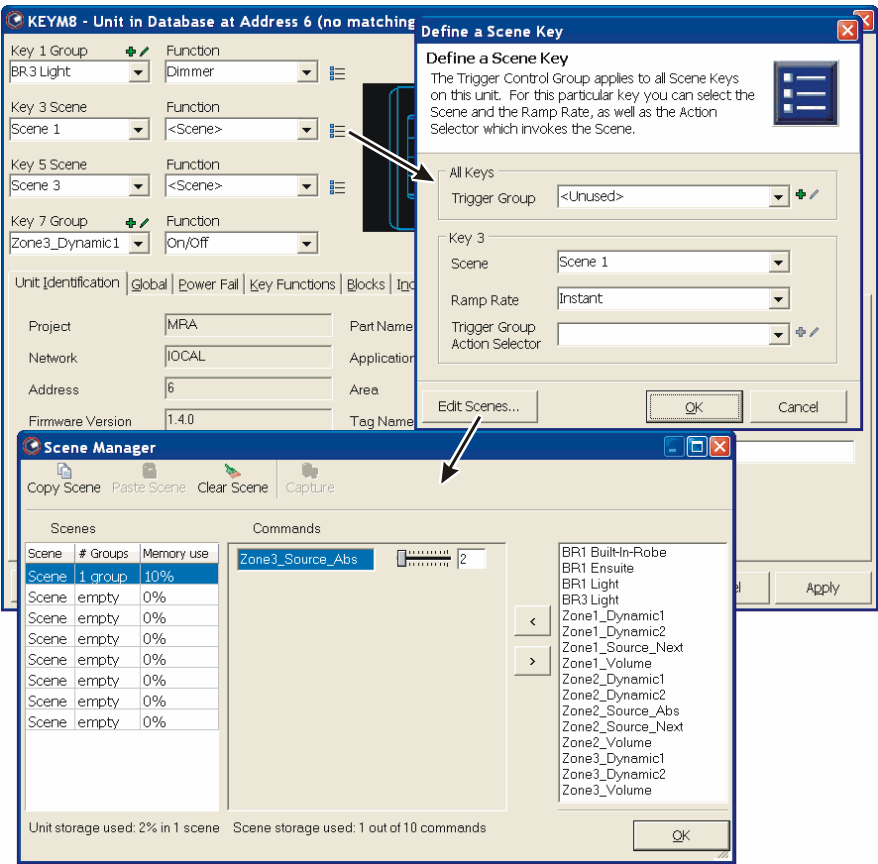

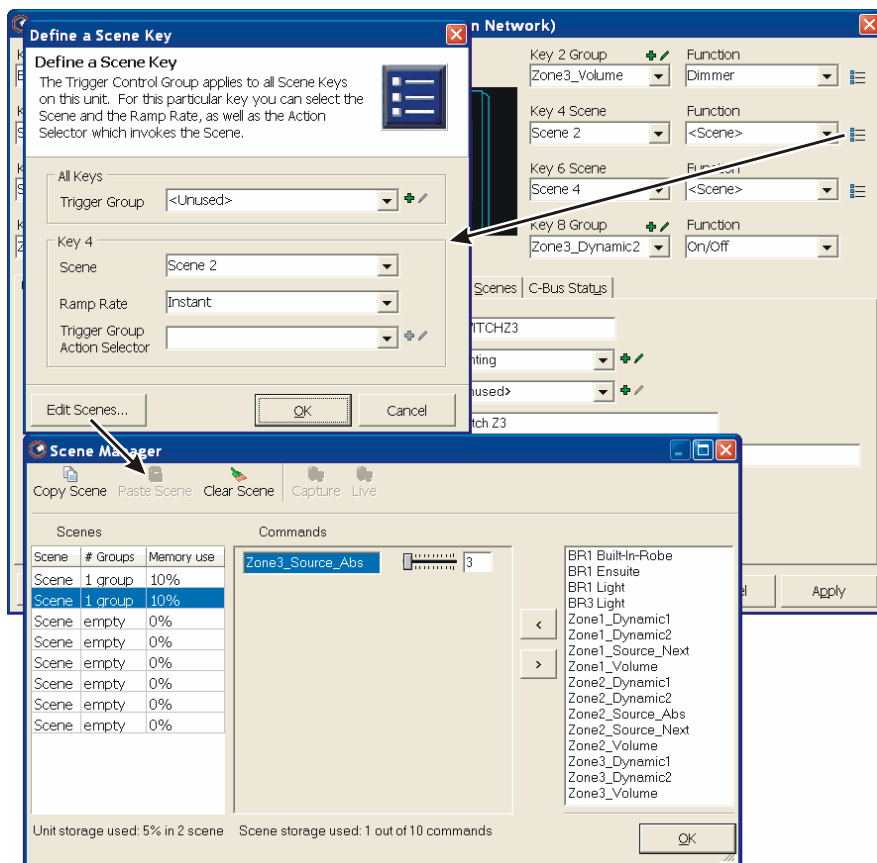Figure 33 – Configuring the Neo wall switch for Zone 3 (showing Scene 1)

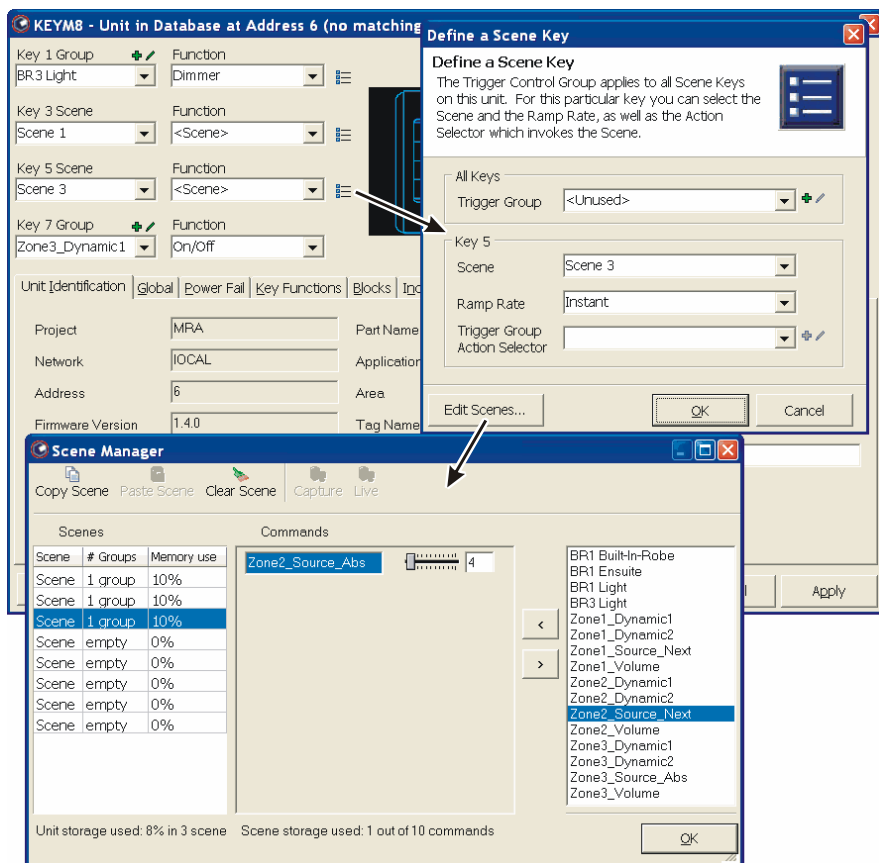Figure 34 – Configuring the Neo wall switch for Zone 3 (showing Scene 2)

Figure 35 – Configuring the Neo wall switch for Zone 3 (showing Scene 3)
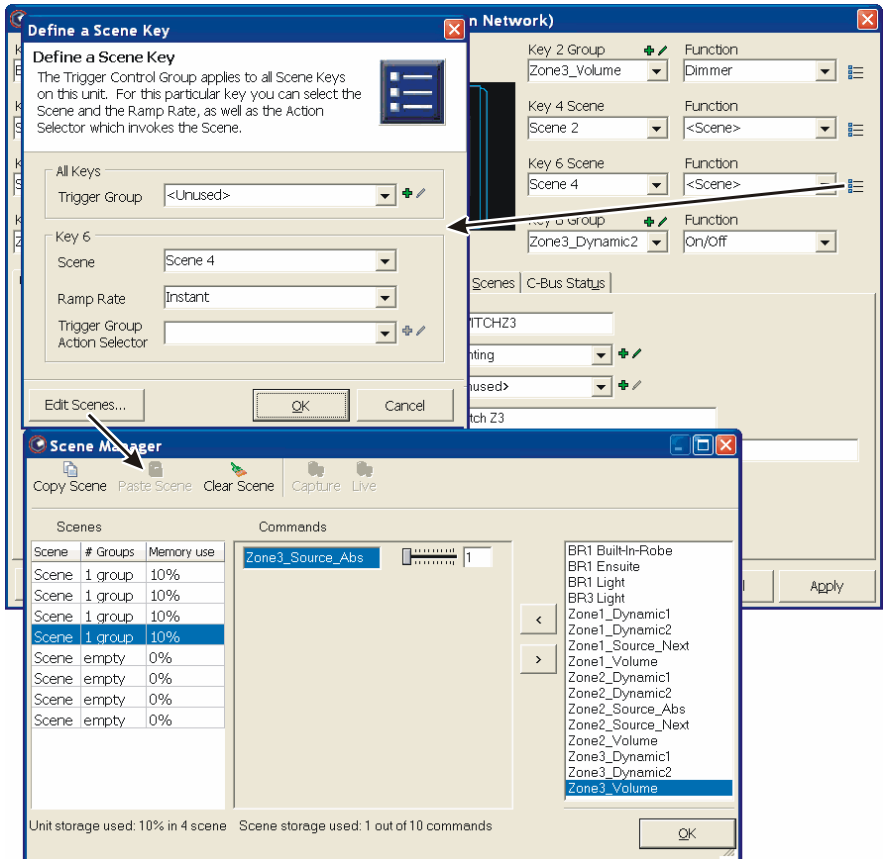
Figure 36 – Configuring the Neo wall switch for Zone 3 (showing Scene 4)

9)   Configure any additional C-Bus units. Figure 37 shows the config-
      uration of the 4 Channel Dimmer used in the example MRA system.
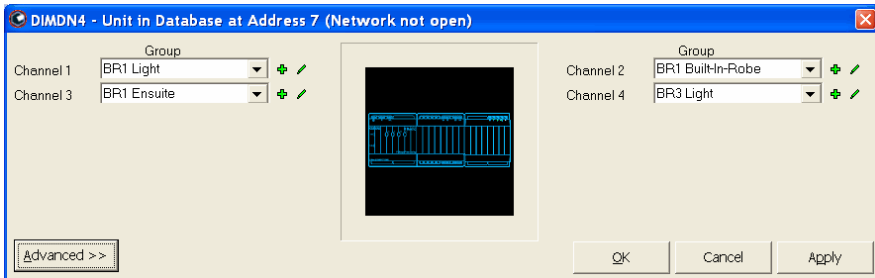

Figure 37 – Configuring the 4 Channel Dimmer in the example MRA system

10) Connect your PC to the C-Bus network in the usual way and open the
      network (right click on the Network branch in the tree and select
      Open Network). Scan the units in from the live network (click the
      Units branch of the tree and then click the Scan Network button).

      Use the "All -> Network" button to transfer the information from the
      units in the database to the units on the C-Bus network.

Multiple Amplifiers in the Same Zone

You can connect multiple Amplifiers to the same zone. The Digital Input of
the first Amplifier in the zone is connected to the Digital Output of the
Matrix Switcher (or Distribution Unit). The Digital Output of the first
Amplifier is connected to the Digital Input of the next Amplifier and so on,
so that each Amplifier is connected to the previous in series.

When configuring Amplifiers connected in this way, set one Amplifier as a
Master and all others as Slaves (on the Audio Levels tab). It is recom-
mended you set a Desktop Amplifier as the Master if the zone includes any
Amplifiers of this type.

Amplifiers in Standalone Mode

When Amplifiers are connected in standalone mode (using a Distribution Unit instead of a Matrix Switcher), the zone number must be manually configured for each Amplifier. This is done on the Zoning tab, shown in Figure 38.

For the Amplifiers used in the standalone configuration in Figure 3 (Page 8), the first Amplifier would be set to Zone 1, the second to Zone 2 and the third to Zone 3. All Amplifiers connected in the same standalone installation must be set to the same Matrix Switcher number.

Figure 38 – Setting the zone number of a standalone Amplifier

10.2   MARPA

The Matrix Switcher needs to be programmed with the Multi Room Audio Rapid Programming Application (MARPA). Use this application to:

- assign an ID to the Matrix Switcher (in case multiple Matrix Switchers are used on the same network of a C-Bus installation)
- configure parameters for each audio source, such as,
  - the label (description) displayed when the source is selected
  - the gain/attenuation
  - whether the source is available
  - which C-Bus commands are triggered by the Dynamic controls
- configure parameters for each zone, including,
  - the label (description) displayed when the zone is selected
  - whether labels are sent to C-Bus DLT switches
  - whether the local input source is available
- configure IR maps for dynamic control (if used).

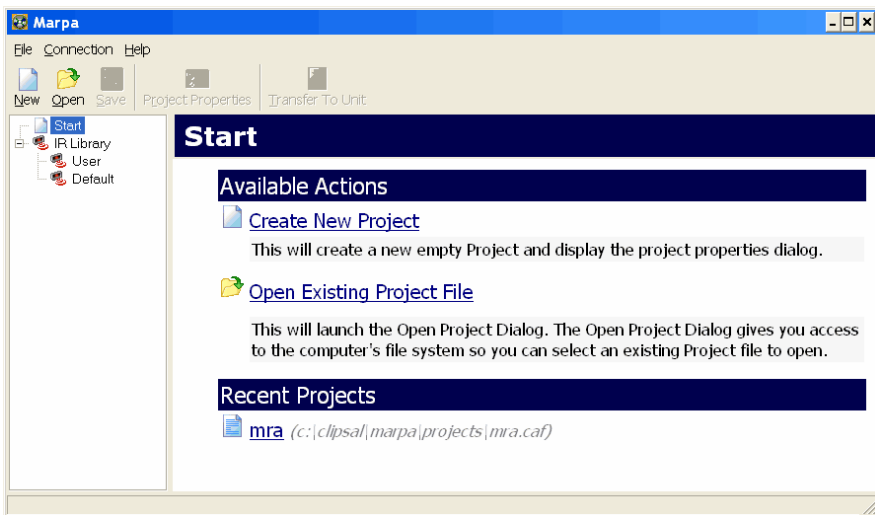1) Start MARPA and choose the Create New Project action (Figure 39).

Figure 39 – The MARPA start-up window

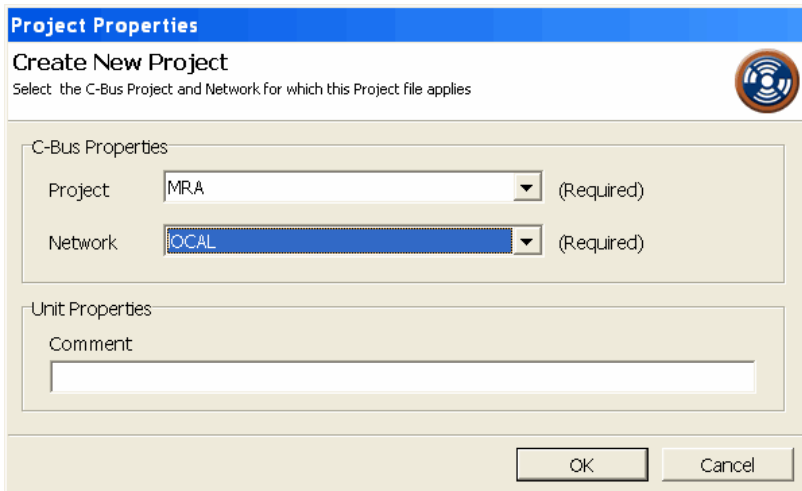2) Select the C-Bus project you created in Toolkit, then select the network (Figure 40). Click OK.

Figure 40 – Selecting the C-Bus project and network

3) The General branch of the Project tree is selected. The default settings on this branch are suitable for a typical single Matrix Switcher system such as the example MRA system. If you have multiple Matrix Switchers on the same C-Bus network (you can have up to three), you need to give each one a unique number.
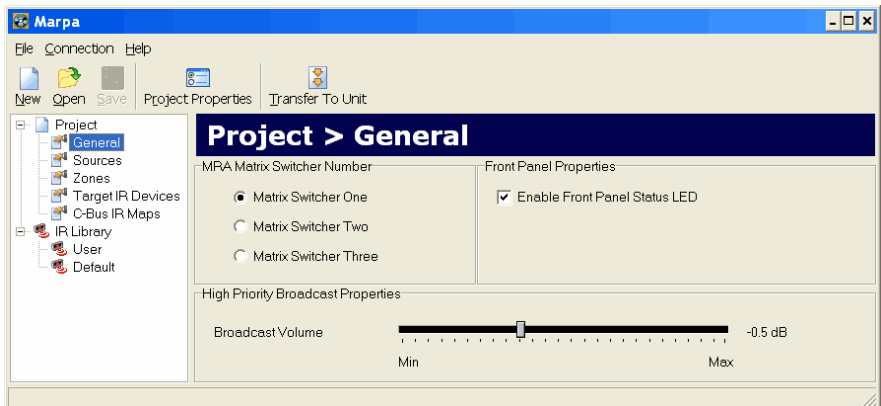

Figure 41 – MARPA's General branch

4)   Select the Sources branch of the Project tree. The Local source tab is selected (Figure 42). The Description of the Local source can be changed here. Its default is "Local". The Description is displayed on the Matrix Switcher LCD when the source is selected. It is also displayed as the label for the source selection control group on a C-Bus DLT wall switch if DLT labelling is enabled.
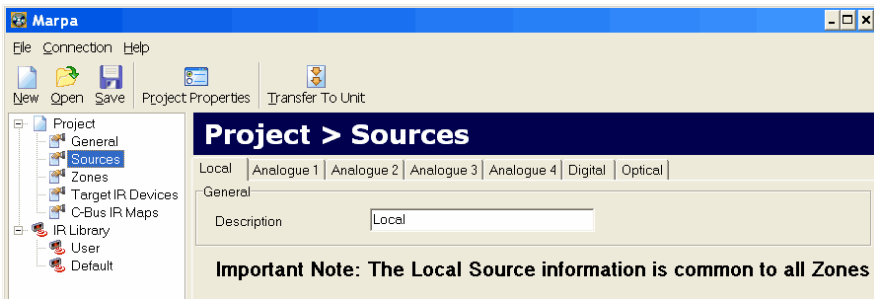

Figure 42 – The Local tab of MARPA's Sources branch

5)   In turn, select each of the six distributable sources (Analogue 1 to Optical), and:

·   disable the "Include this source in "Next" and "Previous" navigation cycle" checkbox if the source will be unused

·   enter the Description (if the source will be used)

·   enter the Description for the Dynamic 1 and 2 controls (if used)

·   select the Trigger Group and Selector for the Dynamic 1 and Dynamic 2 control (if used).

The Analogue 1, 2 and 3 tabs shown in Figures 43 to 45 are configured for the example MRA system shown in Figure 19. Since the Analogue 4, Digital and Optical source inputs are not used in the example system, the "Include this source in "Next" and "Previous" navigation cycle" checkbox is disabled in their respective tabs, as shown in Figure 46.
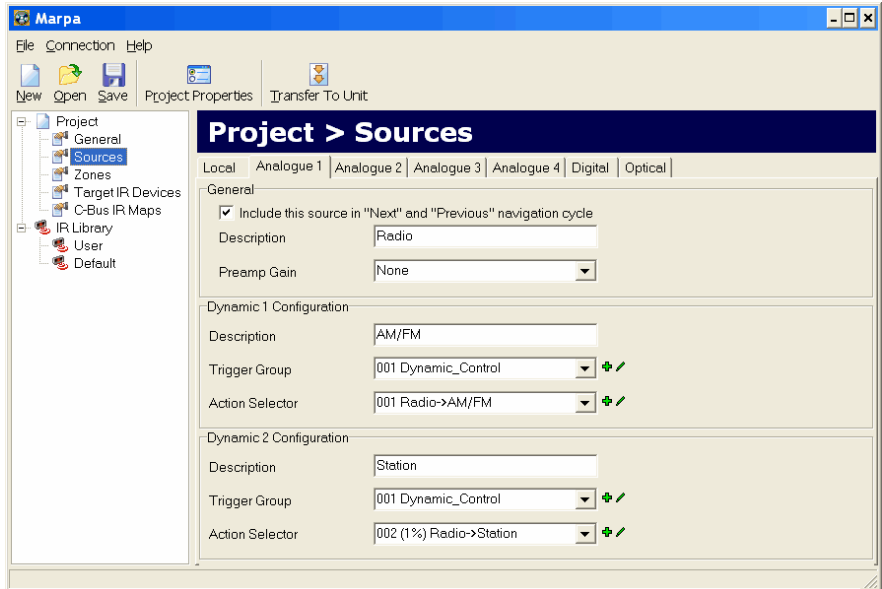
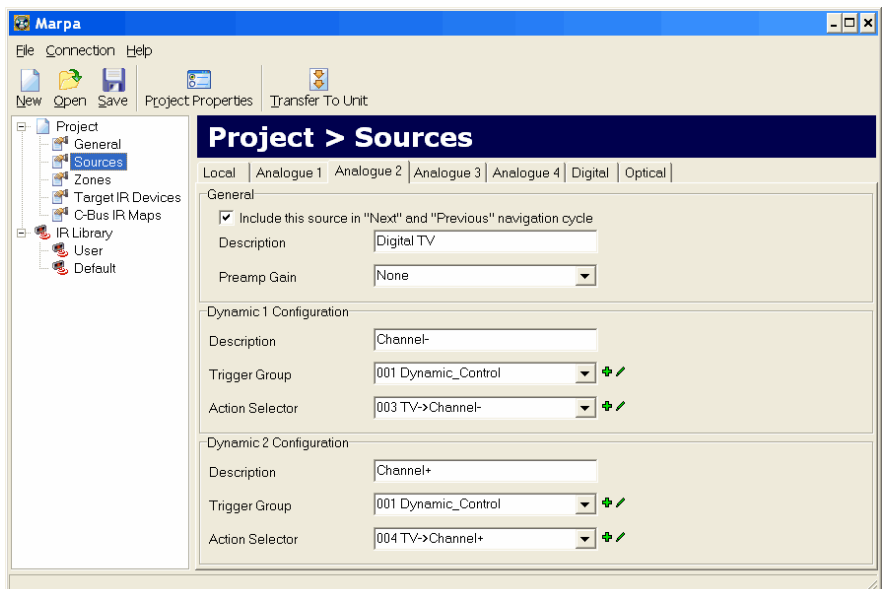Figure 43 – The Analogue 1 tab configured for the example MRA system

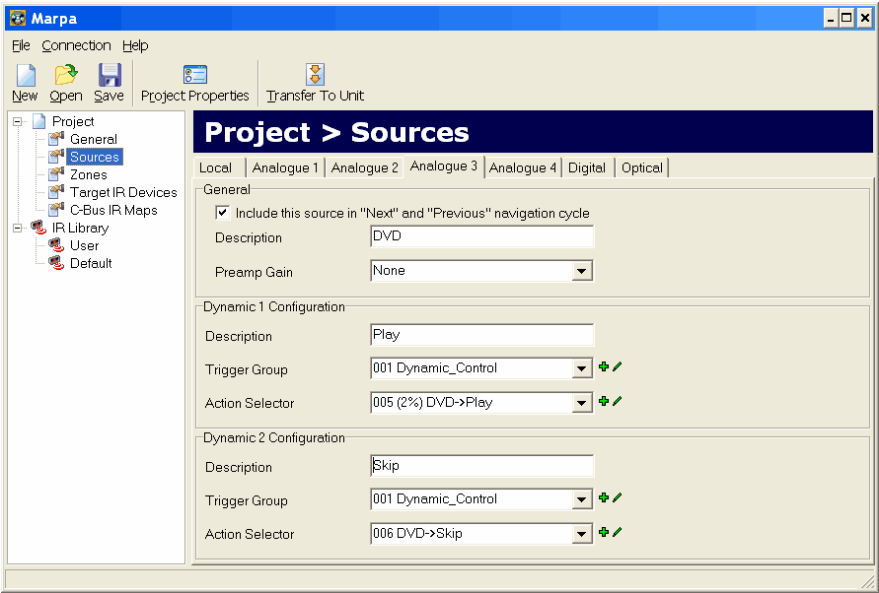Figure 44 – The Analogue 2 tab configured for the example MRA system

Figure 45 – The Analogue 3 tab configured for the example MRA system
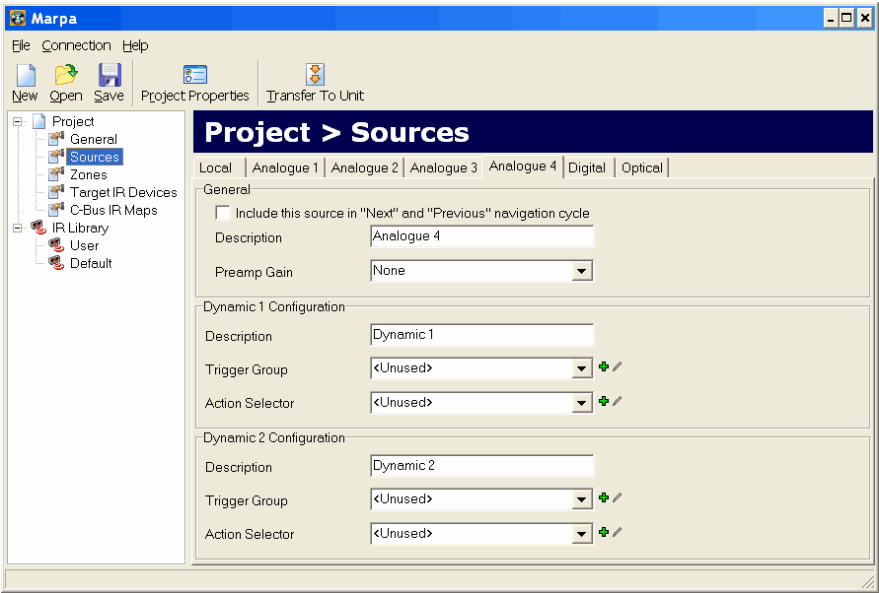

Figure 46 – The Analogue 4 tab configured for an unused source

6) Select the Zones branch of the Project tree. Select each Zone tab that corresponds to a zone used in the MRA system. On each:

· enable the "Generate DLT Labels" checkbox if any C-Bus DLT switches exist in the zone

· enable the Local Source checkbox if a local input may be used in an Amplifier in the zone

· enter the Description (displayed on the Matrix Switcher LCD when a zone selection button is pressed).

Figures 47 and 48 show the Zone 1 and Zone 2 tabs configured for the example MRA system shown in Figure 19. Since a C-Bus DLT wall switch exists in zone 1 only, the Zone 1 tab has its "Generate DLT Labels" checkbox is enabled, but the Zone 2 tab does not.
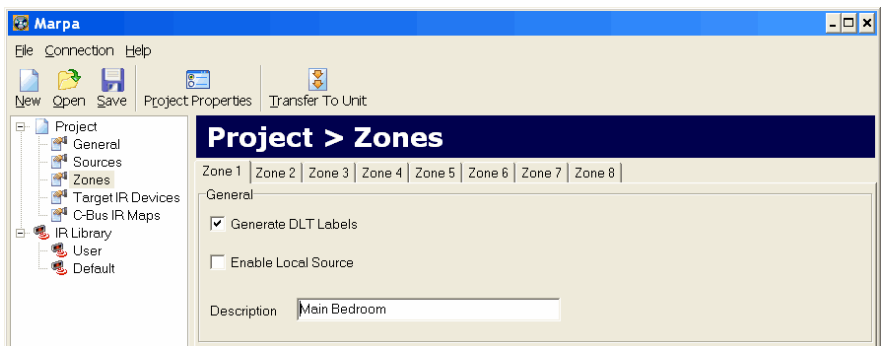

Figure 47 – The Zone 1 tab configured for the example MRA system
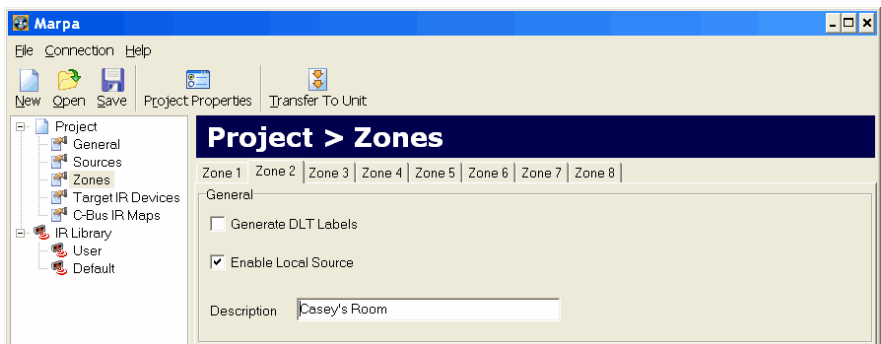

Figure 48 – The Zone 2 tab configured for the example MRA system

Mapping IR Codes to the Dynamic Controls

It is recommended you import the IR codes specific to the devices you will be controlling. IR codes can be obtained using the Clipsal IR Code Learning Unit (Catalogue Number 5100RP) and the IR Reader Software. Together these products learn the codes from an Infrared Control and output them in XML format.

7) Select the User branch of the IR Library tree. Unless the device is already present in the list, click the Import button and select and open the IR Reader file to be imported. Select the device in the list (if not already selected) and click the Add to Project button. Figure 49 shows an example device selected in the User branch of the IR Library.

Figure 49 – A device selected in the User branch of the IR Library

8) Select the C-Bus IR Maps branch of the Project tree. This is where you map the IR codes to selectors in Trigger Control Group Addresses.

   i) Click the Add button to bring up the "Add C-Bus IR Map to Project" panel.

   ii) In the left hand window, click on the [+] next to the Trigger Control branch to expand the tree.

   iii) Click on the [+] next to the Dynamic_Control group you created in Toolkit, to reveal the selectors.

   iv) In the right hand window, expand the IR code tree to reveal the commands.

   v) For each selector on the left, click the IR command on the right and while continuing to hold down the mouse, drag the command across to the selector.

Figure 50 shows how to map a remote command to a selector used for dynamic control. After dropping a remote command on a selector, you are prompted to select which channel or channels the IR command is to be output on. These are the physical "IR Out" emitter connectors on the rear of the Matrix Switcher.
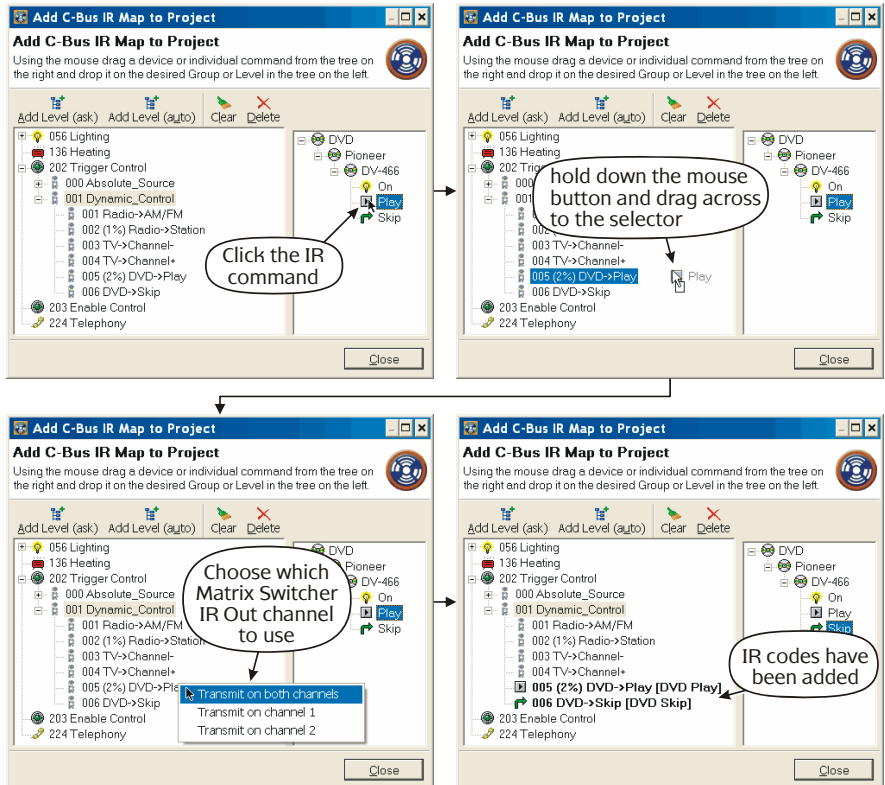

Figure 50 – Mapping IR codes to Dynamic controls

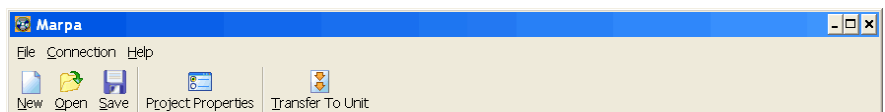9)   Click the Save button (Figure 51) to save the MARPA project.

Figure 51 – Buttons on the MARPA tool bar

10) Transfer the project to the Matrix Switcher. To do this:

    i) Ensure power is connected to the Matrix Switcher and the unit is switched on. A power switch is located on the rear of the Matrix Switcher, next to the AC power socket.

    ii) Use the supplied USB cable (1 m Type A to Type B). Do not extend its length or substitute it for a longer cable. Plug one end into your PC and the other into the rear of the Matrix Switcher.

    iii) Wait about 30 seconds for the driver to respond. If this is the first time you have connected the Matrix Switcher to your PC via the USB, and depending on which operating system you are using, you may be prompted to install driver software ("Found New Hardware"). If so, proceed with the recommended automatic option.

    iv) Click the "Transfer to Unit" button in MARPA (Figure 51).

    v) Select the COM port used by the USB cable. This is likely to be the one with the highest number.

    vi) Click the Start button. A progress bar is displayed as the project is transferred (Figure 52). The project may take one or two minutes to transfer. If a Communications Failure message is displayed, select a different COM port and try again.
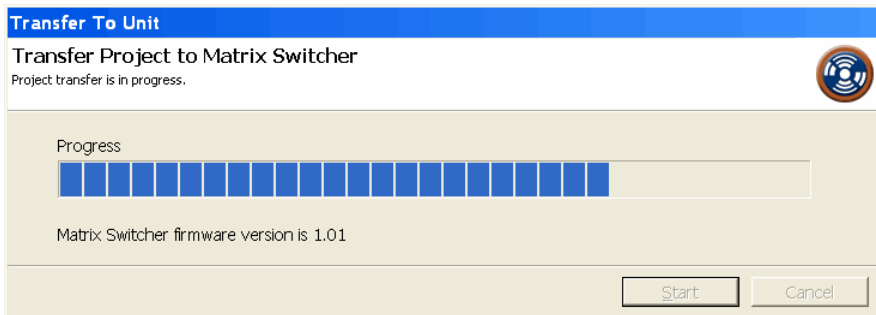

Figure 52 – A progress bar is displayed as the project is transferred
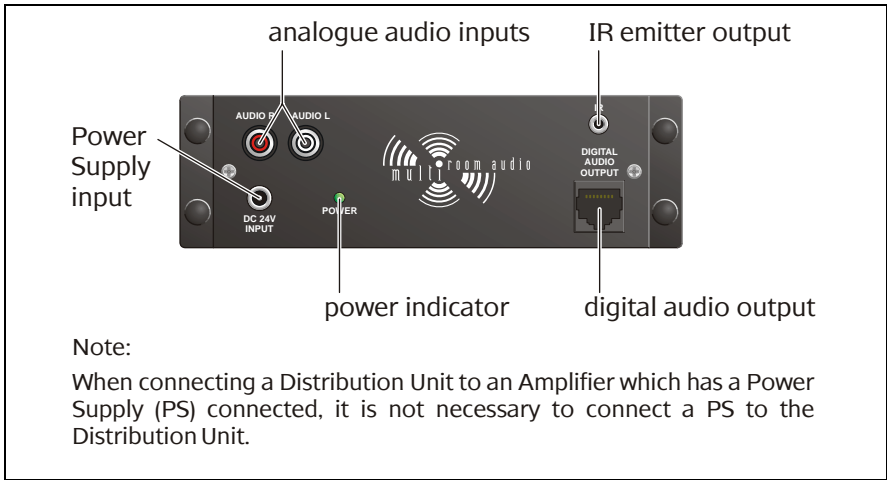
11.0 Unit Connections

11.1 Distribution Unit

Note:

When connecting a Distribution Unit to an Amplifier which has a Power Supply (PS) connected, it is not necessary to connect a PS to the Distribution Unit.

Figure 53 – Distribution Unit connections and indicator

Connection /Indicator	Description
Analogue audio inputs	The line level stereo analogue audio connection.
IR emitter output	This 3.5 mm socket connects to an IR Emitter Lead. IR Emitters can be coupled to IR receivers on equipment, providing remote control from any zone through the Multi Room Audio system.
Power Supply input	The 24 V DC Distribution Unit Power Supply connection. This is used when connecting the Distribution Unit to a Matrix Switcher. The Power Supply not required when the digital audio output is connected to the digital audio input of an Amplifier.

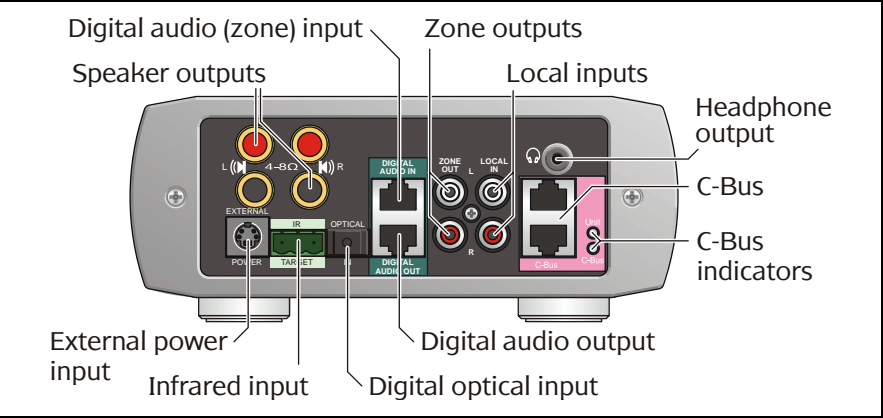| Connection /Indicator	Description
Power indicator	Indicates that power is connected to the unit.
Digital Audio Output	This RJ45 connection outputs the digital audio which has been converted from the analogue input. This connects to a digital input on the Matrix Switcher or Amplifier.

11.2 Amplifiers

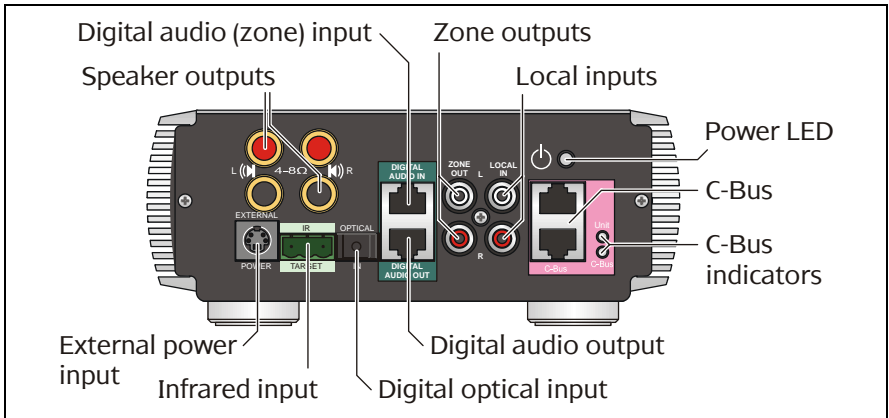Figure 54 – Desktop Amplifier rear panel connections and indicators

Figure 55 – Remote Amplifier rear panel connections and indicators

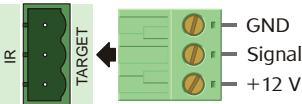| Connection /Indicator	Description
Speaker outputs	These are used to connect to 4 Ω to 8 Ω speakers which are rated at 25 W RMS @ 4 Ω (or 6 W RMS @ 4 Ω if no external power supply is connected to the Amplifier).
Digital audio (zone) input	The zone output of the Matrix Switcher is connected to this input. Alternatively a Multi Room Audio Distribution Unit can be connected to this input, providing one stereo audio input. In this mode, the Amplifier can select between two audio sources: Digital audio input and local input.
Zone outputs (1 × RCA pair)	These are line level outputs of the selected audio source as received by the Amplifier. The outputs are affected by the volume, bass and treble settings of the Amplifier.
Local inputs (1 × RCA pair)	Use this to Connect a local analogue audio source which is available to this Amplifier only.

Connection /Indicator	Description
External power input	This provides power to the Amplifier (when a Matrix Switcher is not used). An external power supply also increases the Amplifier's audio output capacity to 25 W RMS into 4 ohm speakers. Power supply rating: 24 V DC, 3.75 A or 21 V AC, 3.5 A.
Infrared input	This Phoenix socket connects to an IR Target, allowing an infrared remote to control equipment located near the Matrix Switcher. GND, Signal, +12 V
Digital optical input	Use this to connect a digital optical audio source to the Amplifier instead of the digital audio (zone) source. The digital audio format must be 44.1 or 48 kHz stereo. Some digital audio formats (such as surround sound) are not compatible with the Amplifier. **Either a digital audio (zone) or digital optical audio source may be connected to the Amplifier, but not both simultaneously.**
Digital audio output	This is used to connect an additional Amplifier to the same zone as this Amplifier. A Cat-5 cable is used to connect to the additional Amplifier's Digital audio (zone) input. Both Amplifiers will use the same zone (they will both select the same audio source).
C-Bus (×2)	Connects to the C-Bus network.
C-Bus indicators	<u>Unit</u> On: C-Bus network connected Flashing: Data exchange in progress <u>C-Bus</u> On: C-Bus network operational Off: Insufficient C-Bus power or clock Flashing: Insufficient C-Bus power

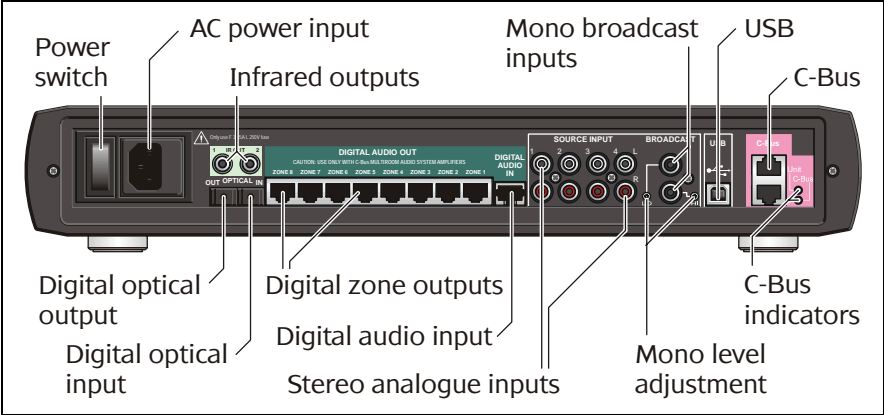Table 2 – Amplifier connectors and indicators

11.3 Matrix Switcher

Figure 56 – Matrix Switcher rear panel connections and indicators

Connection /Indicator	Description
Power switch	Switches the mains power input on and off.
Mains power input (IEC)	Connect mains here to power the Matrix Switcher, and any connected Multi Room Audio Amplifiers which do not have an external power supply.
Infrared outputs (×2)	Use these 3.5 mm sockets to connect to IR Emitter Leads. IR Emitters can be coupled to IR receivers on equipment, providing remote control from any zone through the Multi Room Audio system.

Connection /Indicator	Description
Mono broadcast inputs (×2)	Line level mono audio connected here is broadcast to all zones which have an analogue input source selected.
	There are two mono inputs with different priorities. Audio connected to the Lo input is transmitted by Amplifiers at their current level.
	Audio connected to the Hi input is transmitted at a preset level. Amplifiers which have a digital input source selected, change to the fourth analogue source so they can receive the high priority broadcast audio.
	<u>Note</u>: High priority (HI) broadcast audio uses left channel speakers. Low priority (LO) broadcast audio uses right channel speakers.
USB (Type B)	This is used by the installer to configure the Matrix Switcher.
C-Bus (×2)	Connects to the C-Bus network.
Digital optical output	Retransmits the data received by the digital optical input.
Digital optical input	Use this to connect a digital optical audio source to be distributed to any of the eight zones. The digital audio format must be 44.1 or 48 kHz stereo. Some digital audio formats (such as surround sound) are not compatible with the Matrix Switcher.
Digital zone outputs (×8)	Each zone output is used to connect the Matrix Switcher to one Amplifier in each zone. Additional Amplifiers can be added to a zone by connecting their Digital Audio In socket to the Digital Audio Out of an existing Amplifier.
Digital audio input	A Multi Room Audio Distribution Unit can be connected to this input, providing an additional stereo audio input.

Connection /Indicator	Description
Stereo analogue inputs (4× RCA pairs)	Connect up to four stereo analogue inputs to be distributed to any of the eight zones.
Mono level adjustment (×2)	These adjust the level of the audio source connected to the mono broadcast inputs. Use a small flat head screwdriver to rotate the control if the audio source is too quiet or loud.
C-Bus indicators	<u>Unit</u> On: C-Bus network connected Flashing: Data exchange in progress <u>C-Bus</u> On: C-Bus network operational Off: Insufficient C-Bus power or clock Flashing: Insufficient C-Bus power

Table 3 – Matrix Switcher connectors and indicators

12.0 Troubleshooting

Symptom	Possible Explanation
There is no sound after switching the Amplifier on (sound worked previously).	The volume may have been set to minimum, or the Amplifier may have been Muted (on a Desktop Amplifier) before the Amplifier was switched off.
The default volume, bass or treble settings have changed (when switching the Amplifier on).	If a power failure occurs when the Amplifier is on, the volume, bass and treble settings are saved and become the new defaults.
A mains circuit breaker trips when Amplifiers are powered up.	This may occur if more than five Amplifier power supplies are connected to the same circuit, due to a high inrush current.
Unexpected behaviour occurs after the digital zone connections are changed.	The Amplifier's zone settings are not reset until all power is removed from the Amplifier. Alternatively use the Reset Amplifier function on the unit's C-Bus Status tab in the C-Bus Toolkit software.
The wrong Amplifier is responding to source changes.	The "Use Matrix Switcher auto assigned zone" option may not be enabled. This option is in the Amplifier's Zoning tab in the C-Bus Toolkit software. After changing the status of this option (on a live network), use the Reset Amplifier function on the C-Bus Status tab.
The Matrix Switcher no longer responds to button presses.	Switch the Matrix Switcher off for several seconds, then on. Use the power switch on the rear of the Matrix Switcher, next to the AC power socket.

Symptom	Possible Explanation
Dynamic labels don't work on a C-Bus DLT wall switch.	There are several options which need to be selected for labels to function. These options are located: · on the More panel accessed by clicking the "More...." button on the Amplifier's C-Bus Control tab in Toolkit · on the DLT wall switch's Global tab in Toolkit · on the Zones branch of the Project tree in the MARPA software.
An Amplifier switches off, particularly when the volume is loud.	If insufficient current is available for the Amplifier, it will switch itself off. This may occur if the Amplifier receives its power from a Matrix Switcher. The Amplifier may need its own external power supply unit.
An Amplifier emits a high pitched screeching sound when a particular source is selected.	This may occur if an output of an Amplifier is connected to the input of the Matrix Switcher. Such a connection should be avoided as it can cause a feedback loop.
The Matrix Switcher does not power up.	The fuse may need replacing. Fuse replacement is described in the Matrix Switcher User's Guide.
Audio is not broadcast via the Matrix Switcher's high priority (HI) broadcast input.	The level of the audio connected to the broadcast input may not be sufficient to trigger the broadcast.
Cannot hear any sound when using the optical input	The digital audio source may be connected to the optical output instead of the input (on a Matrix Switcher). Some digital audio formats (such as surround sound) are incompatible with the MRA system.

13.0 Electrical Specifications

13.1 Distribution Unit

Parameter	Description
Supply voltage	27 V DC (powered by Amplifier via digital audio connection), or 24 V DC @ 500 mA (via external power pack)
Analogue input signal level (Audio inputs)	2.8 V p-p maximum (31 k Ω)
A/D conversion	16 bit PCM
Operating temperature	10 to 40 °C (50 to 104 °F)
Operating humidity	10 to 90% RH (non-condensing)

13.2 Matrix Switcher

Parameter	Description
Supply voltage	240 V AC
Mains frequency range	47 to 53 Hz and 57 to 63 Hz
AC input impedance	47 kΩ
Power consumption	200 W maximum
C-Bus output voltage	36 V DC maximum
C-Bus output current	$\leq$ 330 mA
Network clock and burden	Software selectable
Analogue input signal level (Source inputs)	2.8 V p-p maximum (47 k Ω)
A/D conversion	16 bit PCM
Operating temperature	10 to 40 °C (50 to 104 °F)
Operating humidity	10 to 90% RH (non-condensing)

13.3   Amplifiers

Parameter	Description
Supply Voltage	27 V DC (powered by Matrix Switcher via digital audio connection), and/or 24 V DC @ 3.75 A (via external switch mode power supply) or 21 V AC @ 3.5 A (via external linear power supply)
C-Bus supply voltage	15 to 36 V DC @ 22 mA
Power consumption	90 W maximum
Network clock and burden	Software selectable
Analogue input signal level (Local inputs)	2.8 V p-p maximum (47 k Ω)
Maximum power output	28 W RMS into 4 Ω (0.514% THD)
D/A conversion	16 bit PCM
Frequency response	40 Hz to 20 kHz (±1 dB)
Total harmonic distortion (1 kHz, 20 W RMS into 4 Ω)	0.36% (using analogue input)
Signal to noise ratio	> 67 db (peak, unweighted)
Operating temperature	Desktop Amp.: 10 to 40 °C (50 to 104 °F) Remote Amp.: 10 to 70 °C (50 to 158 °F)
Operating humidity	10 to 90% RH (non-condensing)

13.4 System Audio Performance

Parameter	Description	
	Matrix Switcher + Amplifier*	Distribution Unit + Amplifier*[†]
Frequency response	40 Hz to 20 kHz (+2.4/−0.75 db)	40 Hz to 20 kHz (±2.3 dB)
Total harmonic distortion (1 kHz, 20 W RMS into 4 Ω)	0.16%	0.20%
Signal to noise ratio	> 63 dB (peak, unweighted)	> 63 dB (peak, unweighted)

* Analogue inputs of Matrix Switcher/Distrib. Unit, measured from Amplifier speaker outputs
[†] Amplifier powered by an external switch mode power supply

14.0 Mechanical Specifications

Unit	Weight
Distribution Unit	180 g
Desktop Amplifier	
Remote Amplifier	
Matrix Switcher	

Distribution Unit

Desktop Amplifier

Remote Amplifier

Matrix Switcher

8.3 mm   280.0 mm   8.0 mm

66.1 mm

424.3 mm

346.3 mm

228.9 mm

30.0 mm

15.0 Standards Complied

DECLARATIONS OF CONFORMITY

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards
The Multi Room Audio Matrix Switcher complies with the following:

Regulation	Standard	Title
Electrical Safety	AS/NZS 60065	Audio, video and similar electronic apparatus - Safety requirements
EMC (C-Tick)	AS/NZS CISPR 22	Information technology equipment - Radio disturbance characteristics (emissions)

The Multi Room Audio Amplifiers comply with the following:

Regulation	Standard	Title
Electrical Safety (When powered by PAC090M Power Supply*)	AS/NZS 60065	Audio, video and similar electronic apparatus - Safety requirements
EMC (When powered from Matrix switcher or PAC090M Power Supply*)	AS/NZS CISPR 13	Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics (emissions)

* The Braemac PAC090M power supply (Clipsal Cat. Number 5600P24/3750AU) is certified to:

Safety standards
IEC 60065 and 60950, EN 60065 and 60950,
K60950, J60950(H14), CNS 13438 ,
CAN/CSA C22.2 No's. 60950-1 and 60065-03,
UL 60065 and 60950-1 (UL file 161451)
EMC standards
EN 55022, 55024, 61000-3-2 and 61000-3-3

16.0 Warranty

The Multi Room Audio Distribution Unit, Amplifiers and Matrix Switcher carry a two year warranty against manufacturing defects (refer to the Warranty Statement).

C-Bus Multi Room Audio System
560011 – Audio Distribution Unit

The C-Bus Audio Distribution Unit is an optional device, which can be used with the C-Bus Multi Room Audio System to further enhance Clipsal's cost effective audio product family.

The C-Bus Audio Distribution Unit distributes a single digitised stereo audio input source to multiple locations via amplifiers wired in a parallel format (using RJ45 double adaptors, Cat. No. 5600TEE). Functions such as Volume, Bass, Treble and Balance can be adjusted from a C-Bus input device at any of the audio output locations.

Typical Wiring Diagram
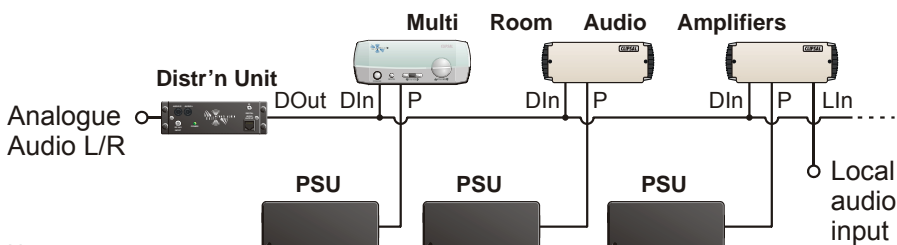
Notes:

Audio inputs are stereo.

Do not connect a Power Supply to the Distribution Unit when it is connected to an Amplifier's Digital Input. In this configuration, the Distribution Unit receives its power from the Amplifier.

DIn – Digital Audio In
LIn – Local In
P – Power input

Note 1: An Audio Distribution Unit power supply must be used when the Audio Distribution Unit is connected to a Multi Room Audio Matrix Switcher. A power supply (Cat. No. 5600P24/500AU) is not supplied with the Audio Distribution Unit.

SPECIFICATIONS

Electrical Characteristics

Supply	24 V DC
Harmonic distortion	≤ 0.05%
Frequency response	100 Hz to 20 kHz

Mechanical Characteristics

Dimensions (W × H × D)	165.5 × 50 × 34 mm
Stereo Connection	2 × RCA (L/R)
Digital Audio Connection	1 × RJ45
IR Emitter Port	Yes

Environmental Characteristics

Operating Temperature	10 to 40 °C
Operating Humidity	10 to 90% RH non-condensing

2 YEAR WARRANTY

1. The benefits conferred herein are in addition to, and in no way shall be deemed to derogate; either expressly or by implication, any or all other rights and remedies in respect to Clipsal Integrated Systems Product, which the consumer has under the Commonwealth Trade Practices Act or any other similar State or Territory Laws.

2. The warrantor is Clipsal Integrated Systems Pty Ltd of 12 Park Terrace, Bowden, South Australia, 5007. Telephone (08) 8345 9500. With registered offices in all Australian States.

3. This Clipsal Integrated Systems Product is guaranteed against faulty workmanship and materials for a period of two (2) years from the date of installation.

4. Clipsal Integrated Systems Pty Ltd reserves the right, at its discretion, to either repair free of parts and labour charges, replace or offer refund in respect to any article found to be faulty due to materials, parts or workmanship.

5. This warranty is expressly subject to the Clipsal Integrated Systems Product being installed, wired, tested, operated and used in accordance with the manufacturer's instructions.

6. All costs of a claim shall be met by Clipsal Integrated Systems Pty Ltd, however should the product that is the subject of the claim be found to be in good working order, all such costs shall be met by the claimant.

7. When making a claim, the consumer shall forward the Clipsal Integrated Systems Product to the nearest office of Clipsal Integrated Systems Pty Ltd with adequate particulars of the defect within 28 days of the fault occurring. The product should be returned securely packed, complete with details of the date and place of purchase, description of load, and circumstances of malfunction.

Australian Offices

South Australia	12 Park Terrace, Bowden, 5007	(08) 8345 9500
New South Wales	122 Canterbury Road, Padstow, 2211	(02) 9794 9200
	303 North Street, Albury, 2640	(02) 6041 2377
Victoria	83-89 Queens Parade, North Fitzroy, 3068	(03) 9207 3200
Queensland	(Brisbane) 919 Nudgee Road, Nudgee, 4014	(07) 3274 7444
	(Townsville) 736-740 Ingham Road, Mt. Louisa, 4814	(07) 4729 3333
Western Australia	23 Truganina Road, Malaga, 6090	(08) 9442 4444
Tasmania	Unit 23/24 Innocent Street, Kings Meadows, 7249	(03) 6331 6951
Northern Territory	16 Albatross Street, Winnellie, 0821	(08) 8947 0278

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Hong Kong	Clipsal Asia Ltd	+852 2487 0261
India	Elcon Clipsal India Ltd	+91 11 647 3251
Indonesia	PT Clipsal Graha Nusantara	+62 21 630 6430
Malaysia	Clipsal Malaysia Sdn Bhd	+60 3 7665 3555
Middle East	Clipsal Middle East	+971 6 557 0777
New Zealand	Clipsal New Zealand	+64 9 576 3403
Singapore	Clipsal Singapore Pty Ltd	+65 266 1998
South Africa	Clipsal South Africa	+27 11 314 5200
Sri Lanka	Clipsal Sri Lanka (Pty) Ltd	+94 74 792 124
Taiwan	Clipsal Taiwan Co Ltd	+886 2 2558 3456
Thailand	Clipsal Thailand Ltd	+662 952 5338
United Kingdom	Clipsal Ltd	+44 1494 521 111
USA	Clipsal USA Inc.	+1 858 674 2555

10319801

Intermediate 3 C-Bus Training Course

MARPA Software

Course Code: ICB003

Revision Number: V1.0

Contents

1.0 Introduction

The Matrix Switcher is Part of the Multi Room Audio system. The Multi Room Audio Rapid Programming Application (MARPA) is used to configure the Matrix Switcher. The purpose of this manual is to set up a basic configuration of the Matrix switcher. For programming of the amplifier please refer to the programming Amplifiers training manual.

It is expected that the user of this manual has a good understanding of C-Bus programming.

2.0 Opening the Software

Open the software by selecting the Start Menu/Clipsal/MARPA as per Figure 1.
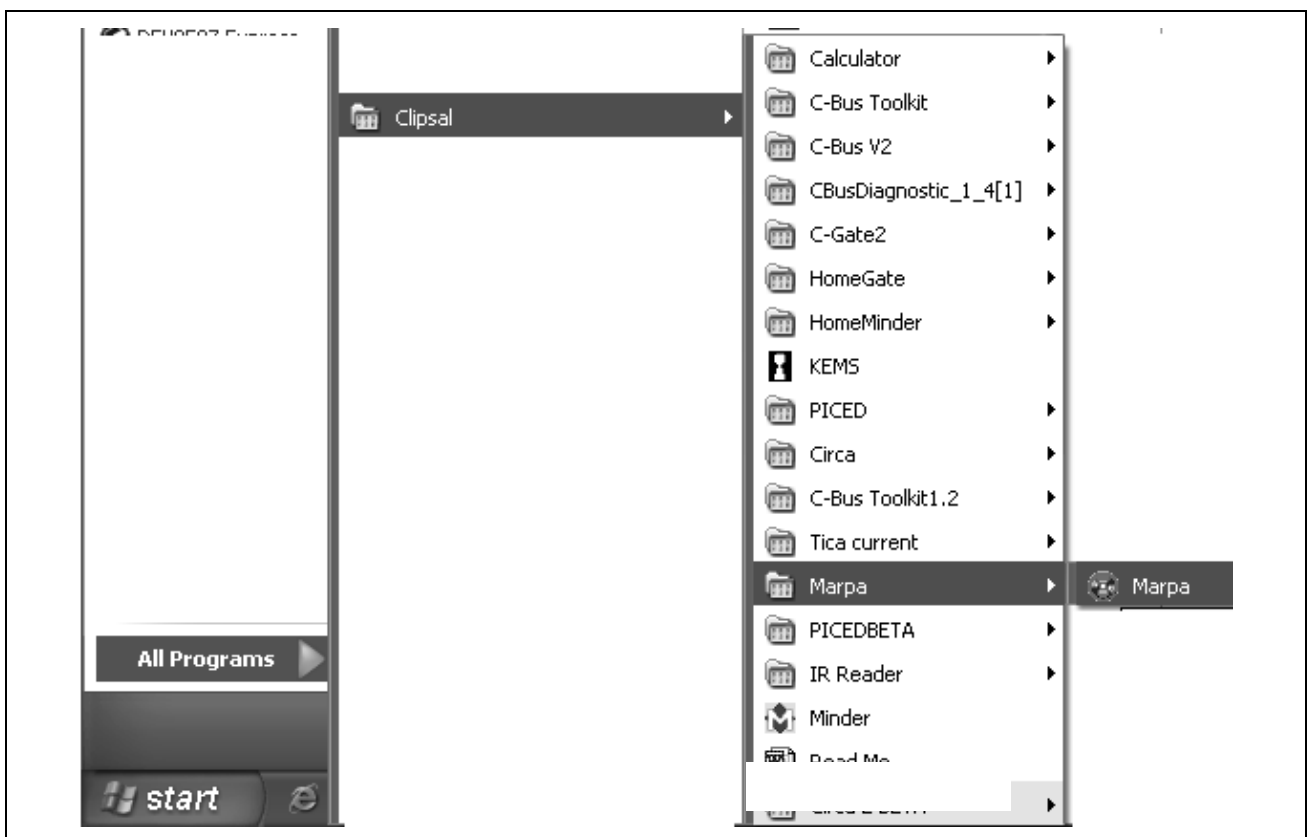
Figure 1

3.0   Starting a New Project

Once the MARPA software is open select the "Create New Project" option as per Figure 2.

Figure 2

The software will then connect to C-gate to get the C-Bus projects stored on the computer. As per Figure 3.
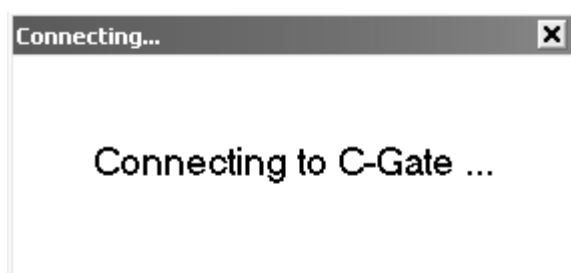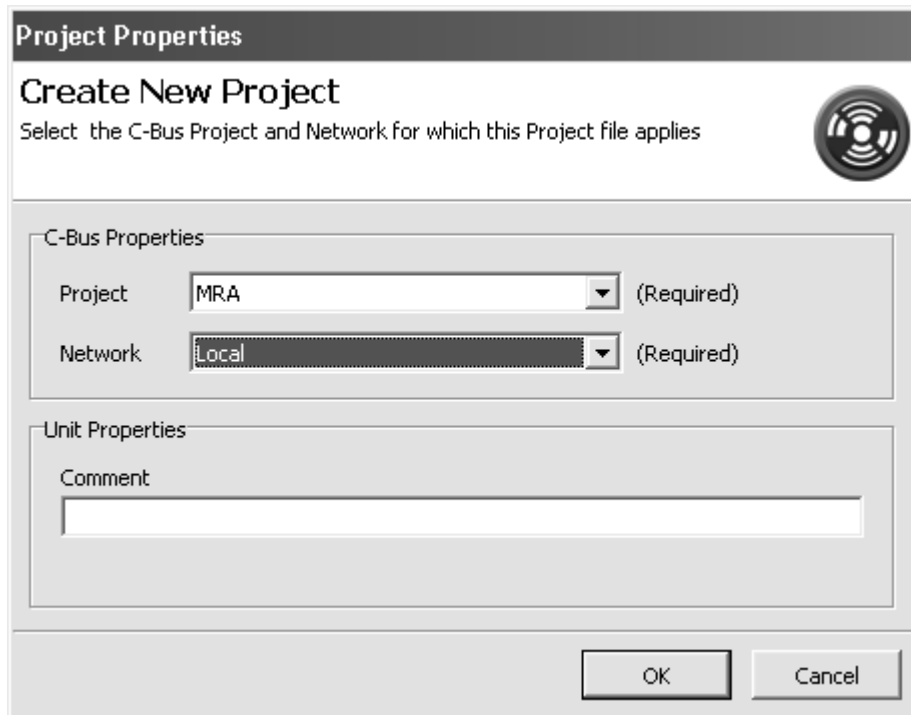
Figure 3

The project properties will then open as per Figure 4. Select the C-Bus project to be used in this project and then select the network that the matrix switcher is connected to.

The comment option is used to put any comments about locality of the matrix switcher or any other information that you decide. Once you have finished filling in the project properties select the ok button.

Figure 4

4.0   General

The first screen to appear is the general screen as per Figure 5. In this screen you can set the General options of the matrix switcher.
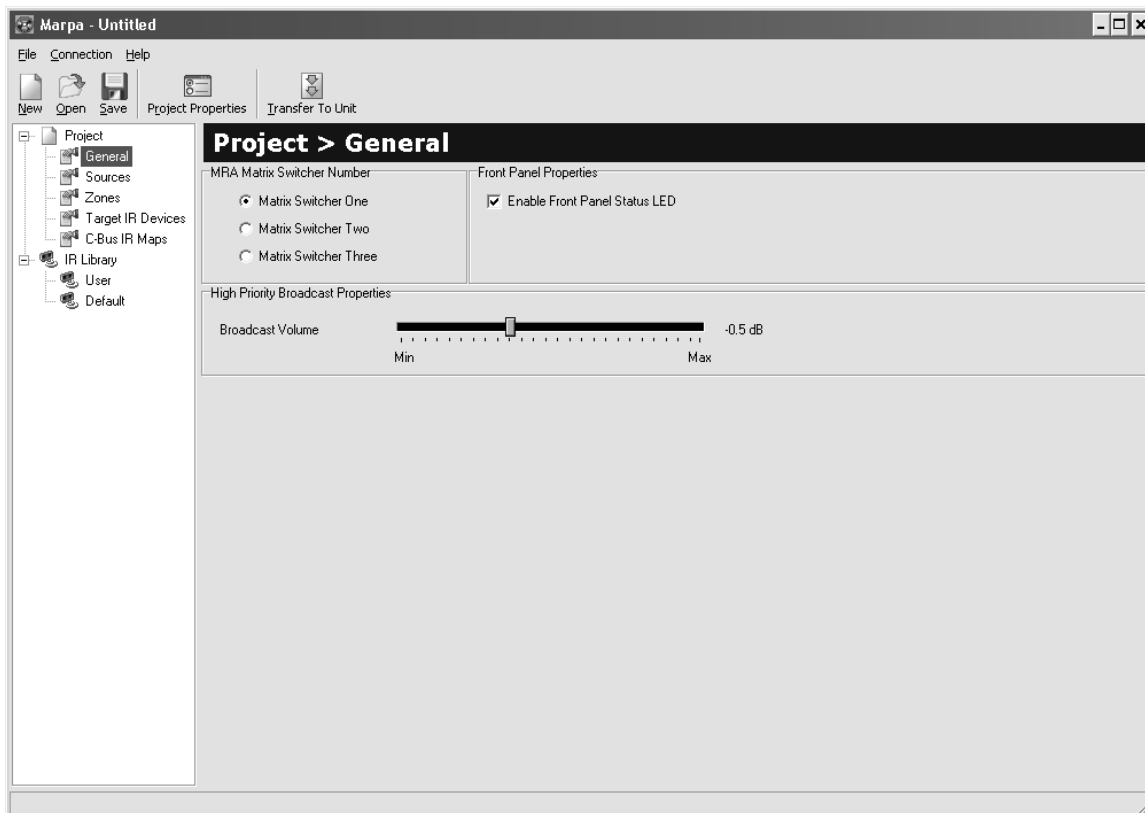
Figure 5

4.1   MRA Matrix Switcher Number

It is possible to have three matrix switchers on a network. If more than one switcher is on the network you need to assign the switcher a number. By default the matrix switcher number is set to number One.

4.2   Enable Front Panel Status LED

On the front of the matrix switcher at the top left side there is a blue led which can be enabled when the matrix switcher is powered. The LED is enabled by default.

4.3   High Priority Broadcast Properties

There is a slider for setting the broadcast volume. From the menu option on the left of the screen select the next option, which is the sources option as per Figure 6.
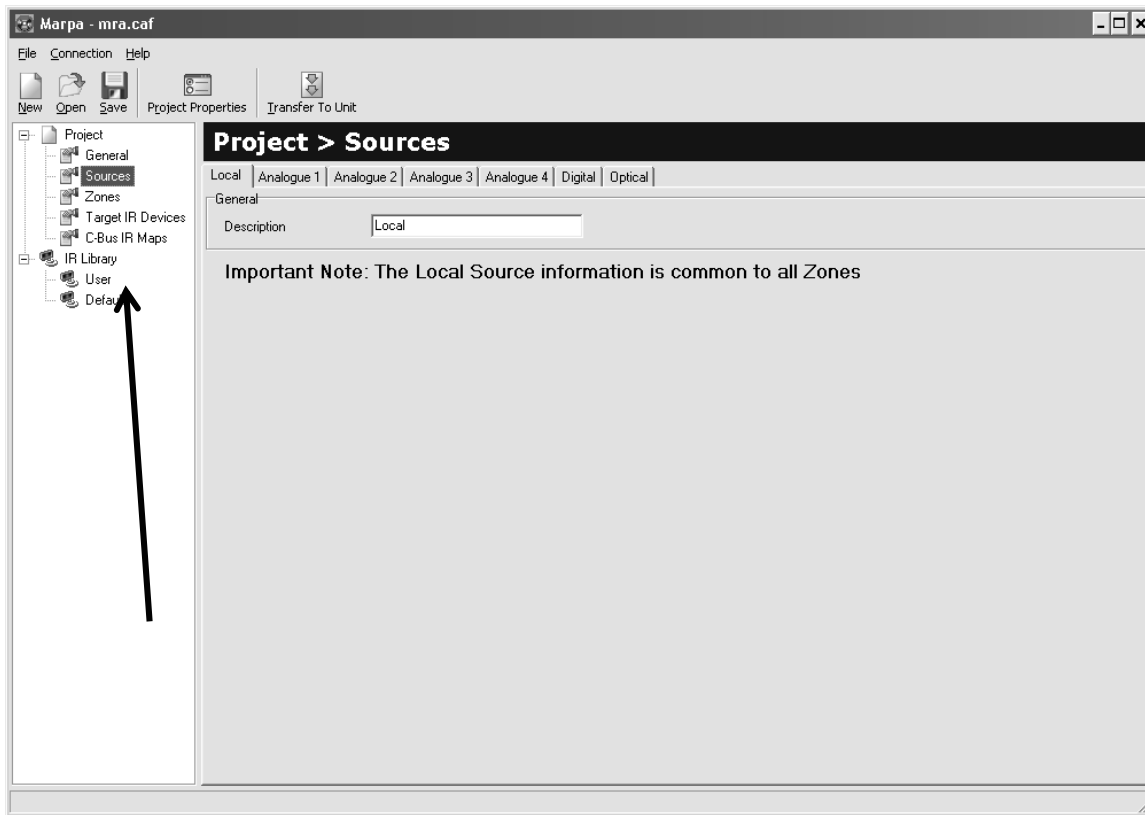
Figure 6

5.0 Sources

In the sources option you have the ability to name the sources that are connected to the Matrix Switcher. The sources available are as follows.

5.1 Local

The Local source is unique to each amplifier. It is possible to have eight "Local" sources so the description of the Local sources should be applicable to all eight amplifiers.

The Local source is a stereo analogue source at the back of the amplifiers.

5.2 Analogue Sources

There are four available stereo analogue sources (RCA connection) available on the Matrix switcher. Select the analogue 1 source tab as per Figure 7.
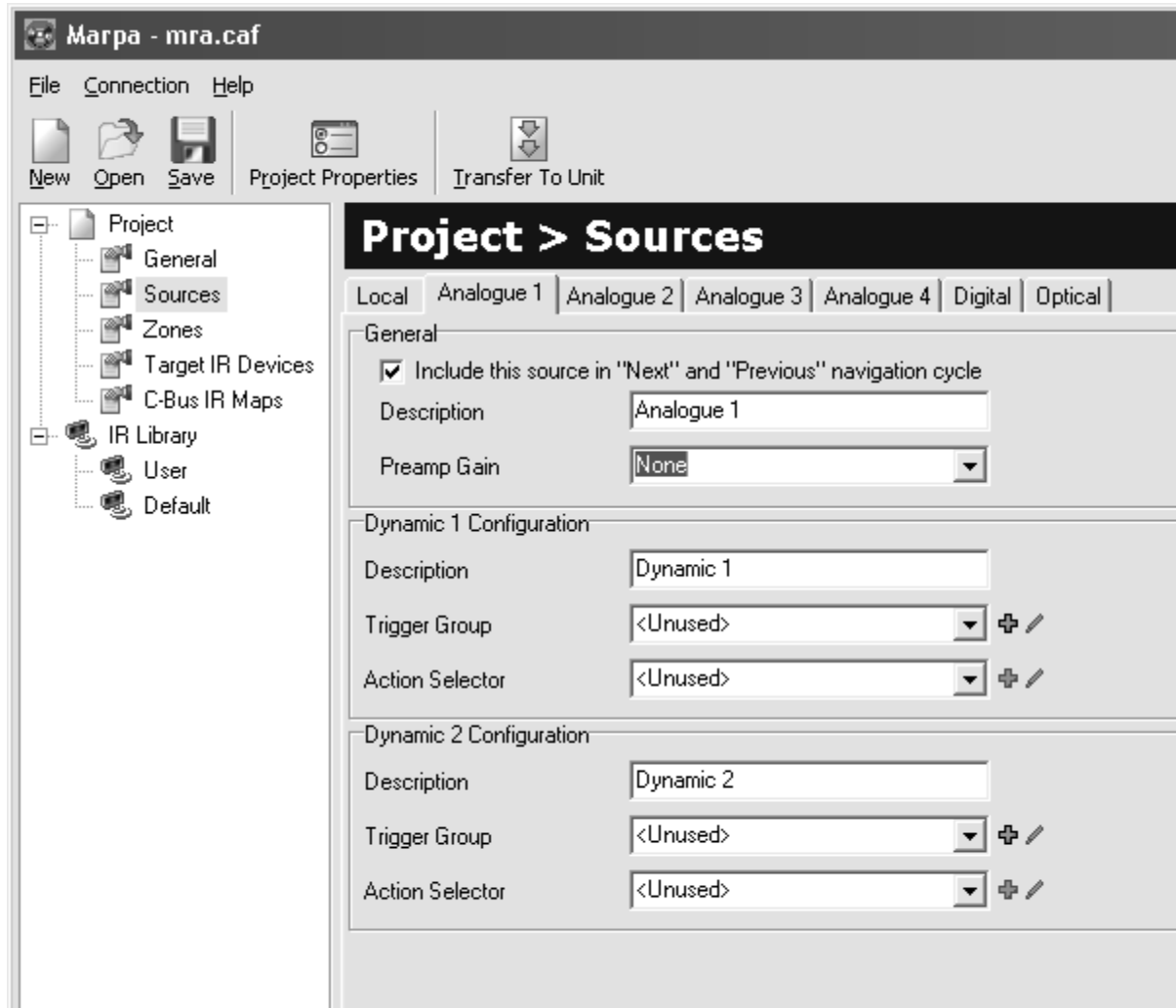
Figure 7

The following options are applicable to all of the analogue sources

5.3 General

Include this source in "Next" and "Previous" navigation

If this option is selected the source will be included in the next and previous option. If the source is not being used this option would be not selected.

Description

Description is the description of the audio device you are using. For example DVD player.

Preamp Gain

The preamp gain can be set from +6 db to -6 db. Depending on what source is plugged in the preamp gain may need to be adjusted. Some audio source give a higher output than other sources they should be adjusted to so that the volume output is the same for each source.

5.4 Dynamic 1 Configuration

When programming the amplifiers there is an option to create a group under the Dynamic 1 option. This Dynamic button will change depending on which source is selected. The dynamic button can be linked to an IR command which is explained in the C-Bus IR maps selection

Description

The description is the name of the action you want the Dynamic 1 button to perform for example play.

Trigger group

Trigger control is the C-Bus group that will be used to trigger an event. The event that can be triggered from a Matrix switcher is IR control however it is possible to trigger an event onto the C-Bus system. For example to trigger a scene from a touch screen or trigger a RS-232 command from a Logic embedded device. It is the action selector within the group address

To add a group select the + add button. For this example you will add a trigger group and assign a tag called DVD Control as per Figure 8.
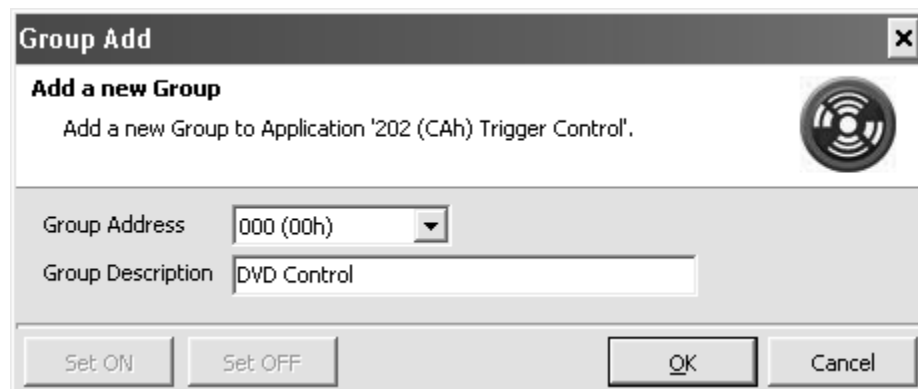
Figure 8

Action Selector

The action selector is a level within a group address. There are 255 levels available within each group address. The action level is used as a trigger point of an event.

For this example you will add an action selector and call it DVD Play as per Figure 9. You will add the IR Commands in the C-Bus IR maps section.
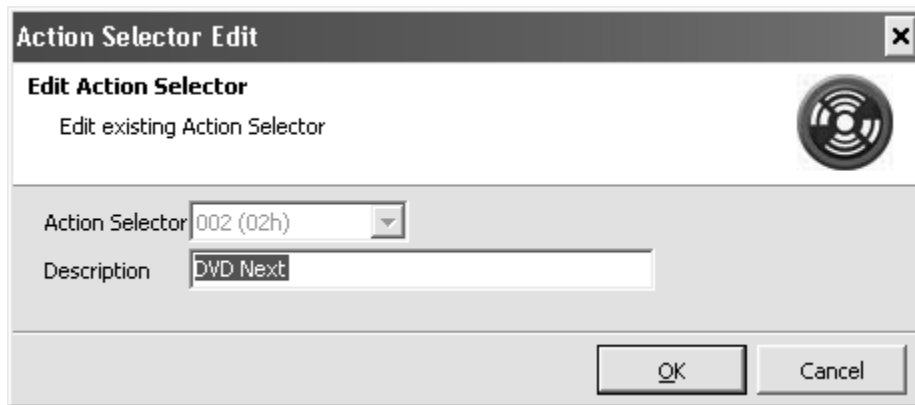

Figure 9

5.5 Dynamic 2 Configuration

The set up of the Dynamic 2 option is set up the same as the dynamic 1 option.

For this example the description of Dynamic 2 will be next. The trigger group will be the same as Dynamic 1. The Action Selector will be DVD Next as per Figure 10.

Figure 10

For every source other than the Local source, the Dynamic 1 & 2 buttons have the ability to trigger a different event. When an amplifier has selected a source, the dynamic 1 & 2 buttons when pressed will trigger the events programmed for that source.

5.6 Digital and Optical Source

The digital source is a Cat-5 input and is used to add the single channel distributor or another digital source to the system.

The Optical source is used to add an optical input to the system. The optical source also has an optical out for cascading the optical source into a surround sound amplifier or any other similar device.

The digital and optical sources are configured the same way as the analogue sources.

Now that you have set up the Trigger group and action selector for Source 1 you need to add the learnt IR Devices to the MARPA project.

6.0 IR Library

Select the IR Library option as per Figure 11.
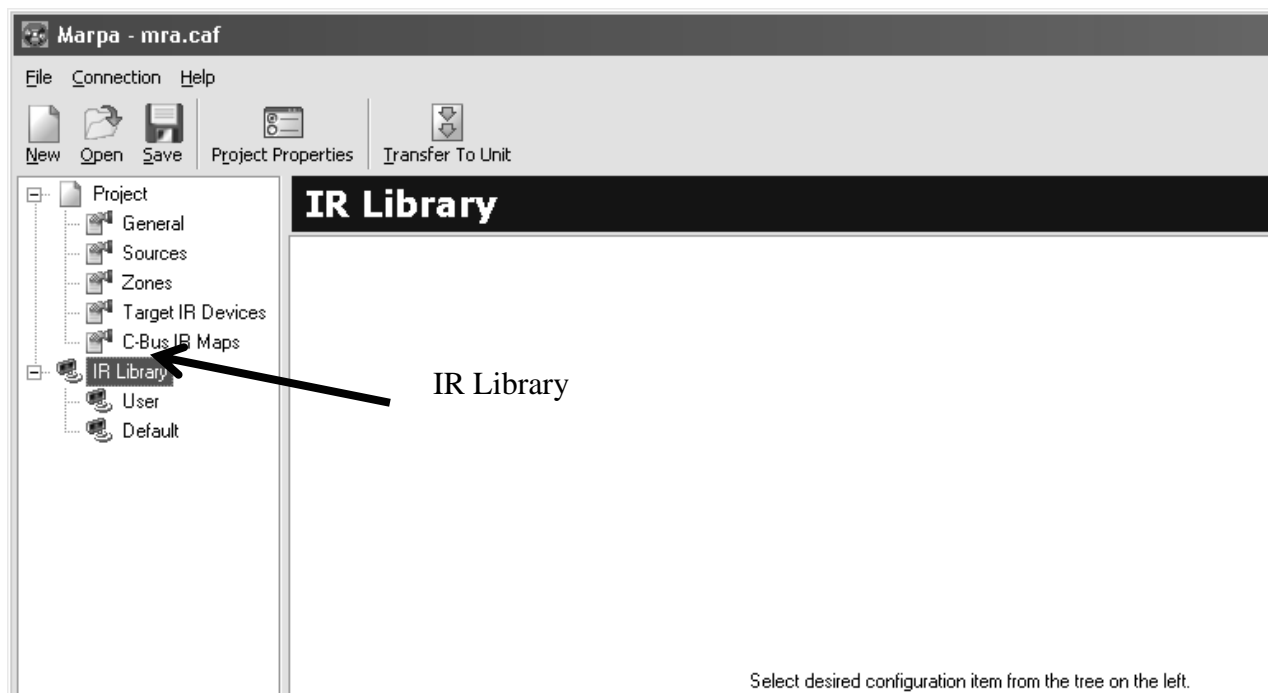
Figure 11

The IR Library is broken into two sections they are as follows.

User

The user library is the IR devices that have been learnt previously by the user using a 5100RP (IR Learner.)

For information on how to learn the codes from an IR device please refer to the IR Reader training manual.

Default

The default library is a list of pre-learnt IR devices these devices come standard with the MARPA software.
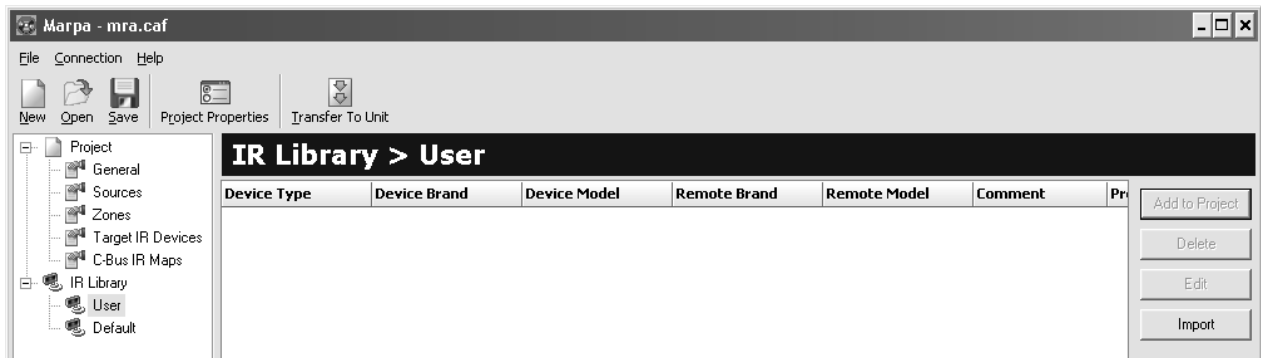
Select the user library.

6.1 adding an IR device

Figure 12

To add a learnt IR device select the Import button as per Figure 12.

The folder option will then appear. Locate the folder the IR device file is stored and then double left click on the file as per Figure 13. If you have used the CIRCA software previously the IR codes will be stored in the 'ImportDataIn' folder.

The IR device file will then appear in the User library.
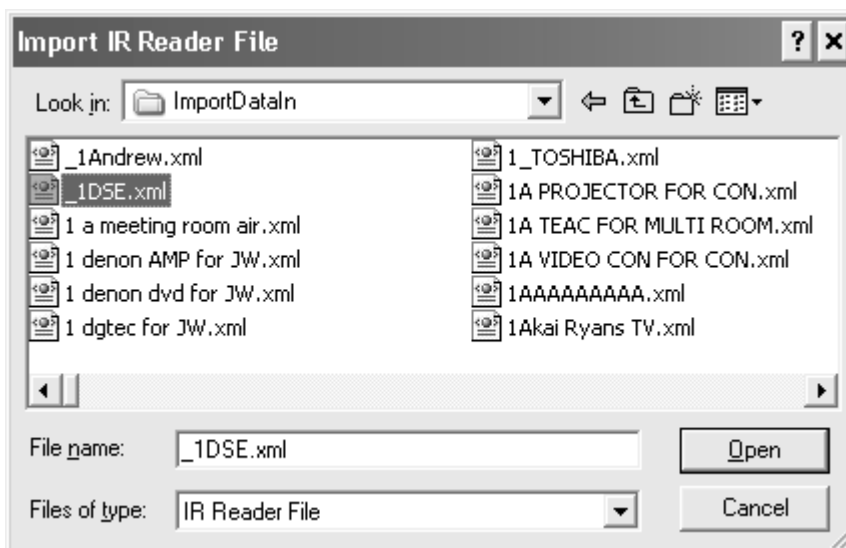
Figure 13

Once you have imported the file select the file and then select the "Add to project" button as per Figure 14.
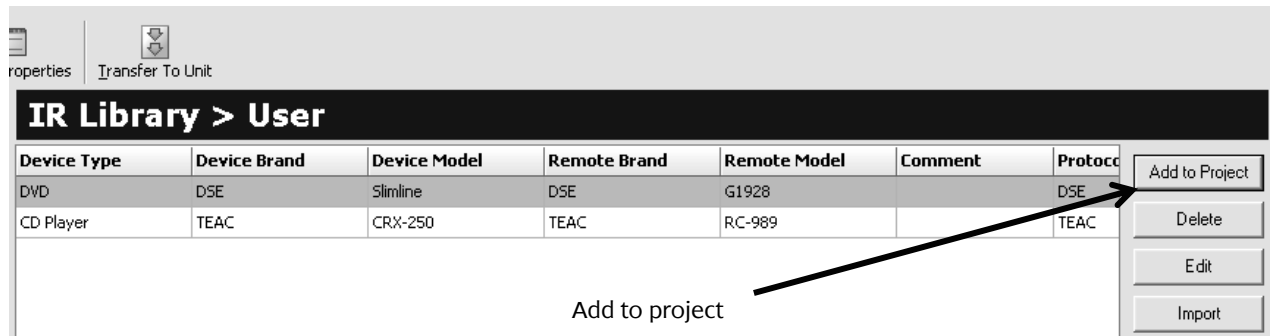
Figure 14

An information box will appear showing that the device has been added to the project.

Now that the IR device is in the project you need to add the IR codes to the C-Bus action selectors to do this select the C-Bus IR maps option.

7.0 C-Bus IR Maps

To set up the IR association to the C-Bus level select the add button as per Figure 15.
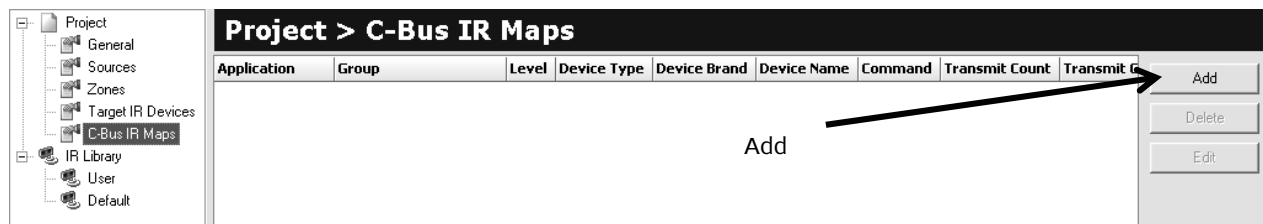
Figure 15

When you select the add button the Quick Start: configuring C-Bus Maps guide will appear as per Figure 16.
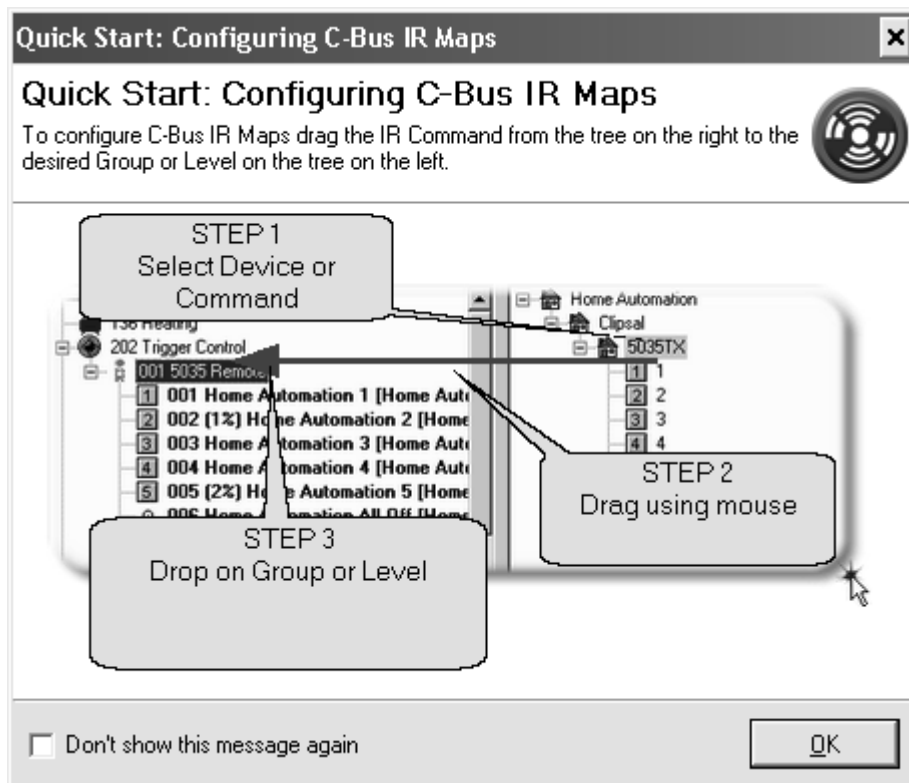
Figure 16

Once you have read the guide select OK.

On the left of the screen the C-Bus groups in the project are displayed and on the right of the screen is the IR devices for the project are displayed.

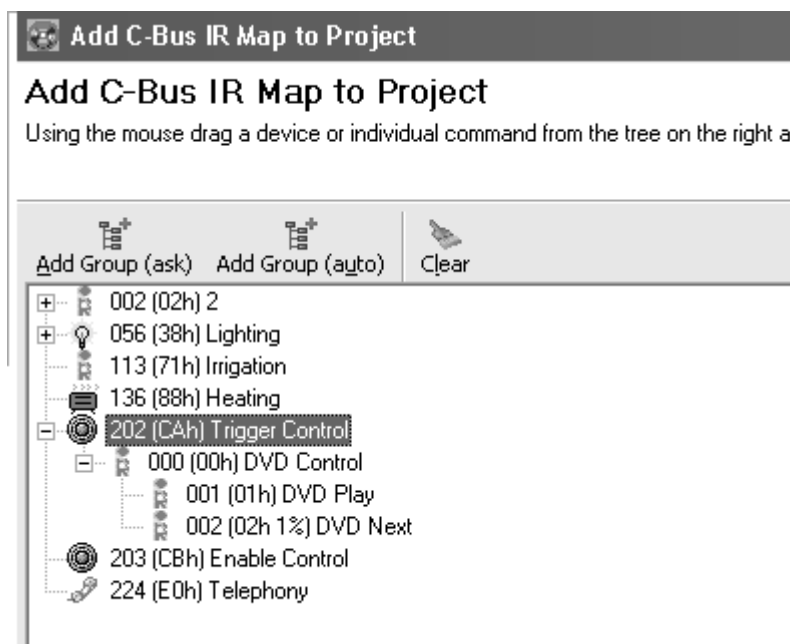Select the Trigger control application and then the DVD Control group address as per Figure 17.

Figure 17

For this project the DSE DVD player has been selected as the IR device select the + button next to the DSE Slimline and the list of IR codes available will be displayed as per Figure 18.
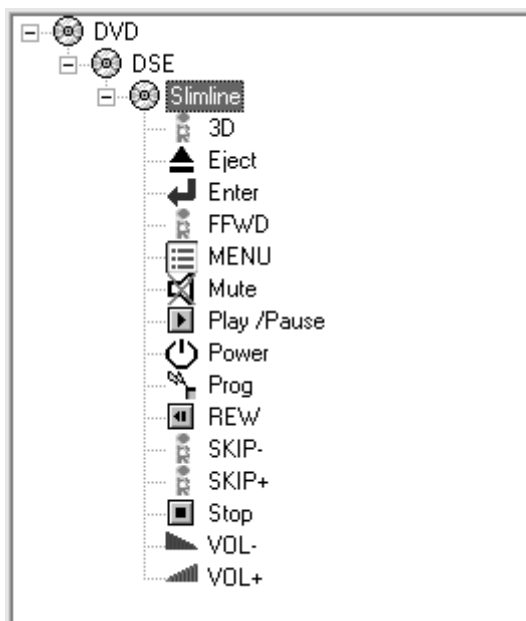

Figure 18

Select the Play/pause code on the DSE Slimline by left clicking and then holding down the Left mouse button drag the code to the Action Selector "Play" under the DVD control group address.

The software will then ask which channel the IR Code will be broadcasted from, the choices are both channels, channel 1 or channel 2. Select both channels and the Play/pause code will appear in the action selector. Repeat the process for the Skip+ option in the 'Next' action selector. The screen should be like Figure 19.
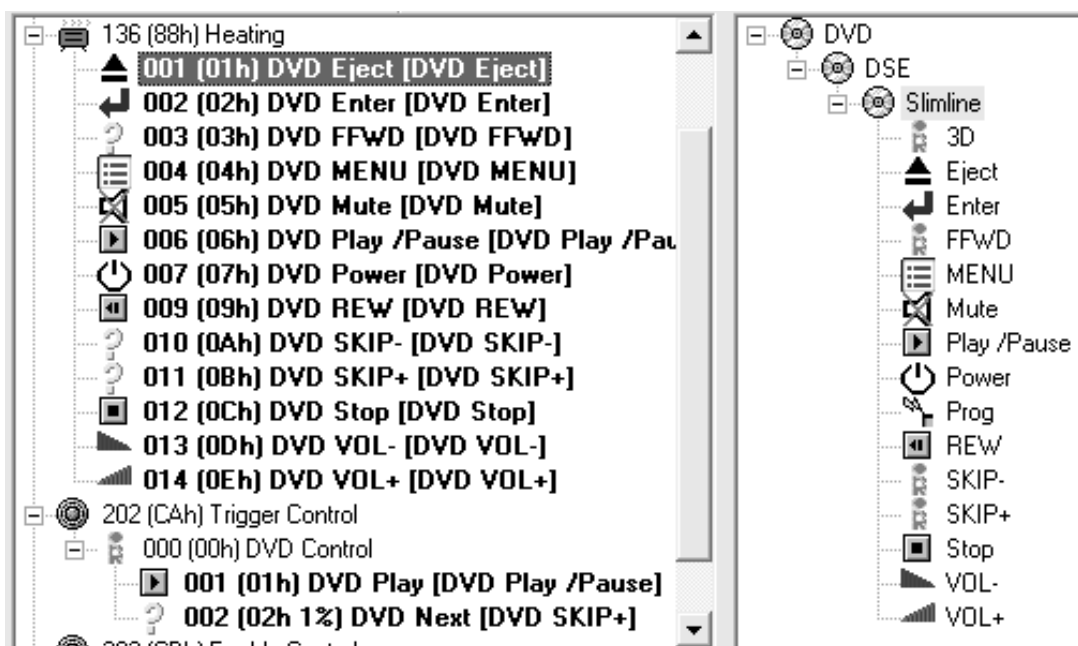
Figure 19

Once you have selected the IR codes for the project select the close option. The information for the IR codes will then be displayed as per Figure 20.
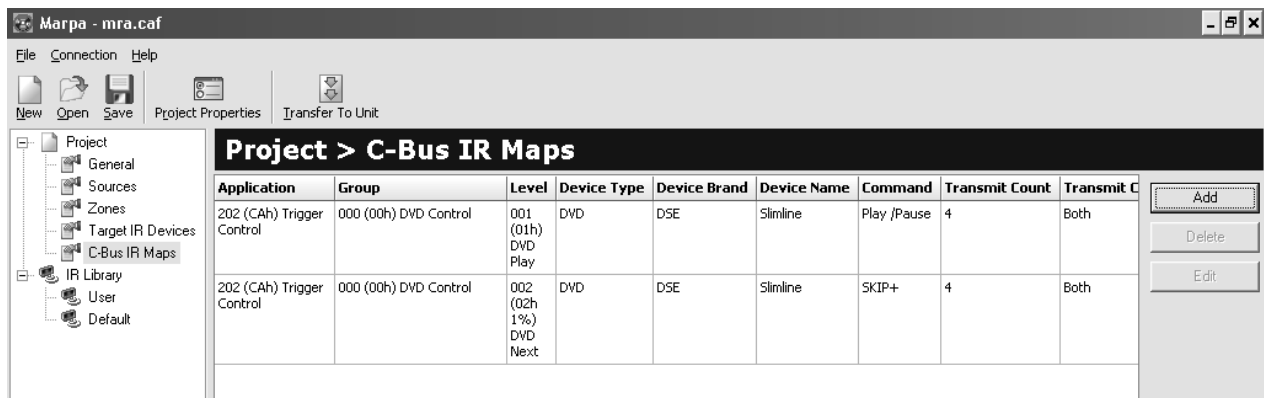

Figure 20

If you need to edit an IR code double left click on the code to bring up the editor as per Figure 21.
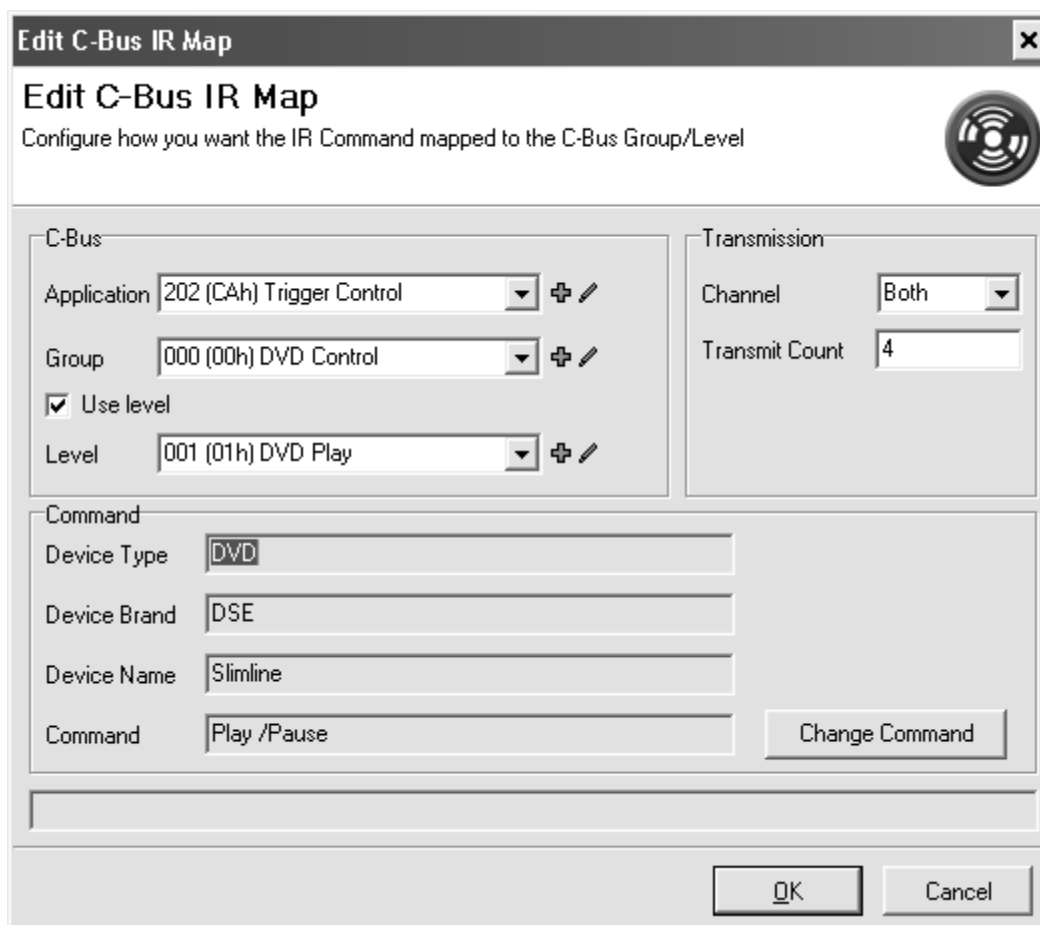

Figure 21

From this screen the C-Bus groups command, channel output can be changed.

The transmit count can also be changed. When a C-Bus button is selected the total number of frames of information played is 4, for codes such as volume or Fwd it may be required to increase the number of frames played whilst the button is pressed.

Each source (except for the Local source) has the Dynamic 1&2 option. An IR code can be assigned to the Dynamic 1&2 for each source.

It is also possible to add IR codes to other C-Bus groups not used in the Dynamic 1&2 options.

These codes can be triggered via a C-Bus switch or a touch screen.

If you go back to the analogue source 1, the IR codes you assigned will now appear under the action selector for Dynamic 1&2.

8.0 Zones

Select the zones option as per Figure 22. The zone tabs will then appear.
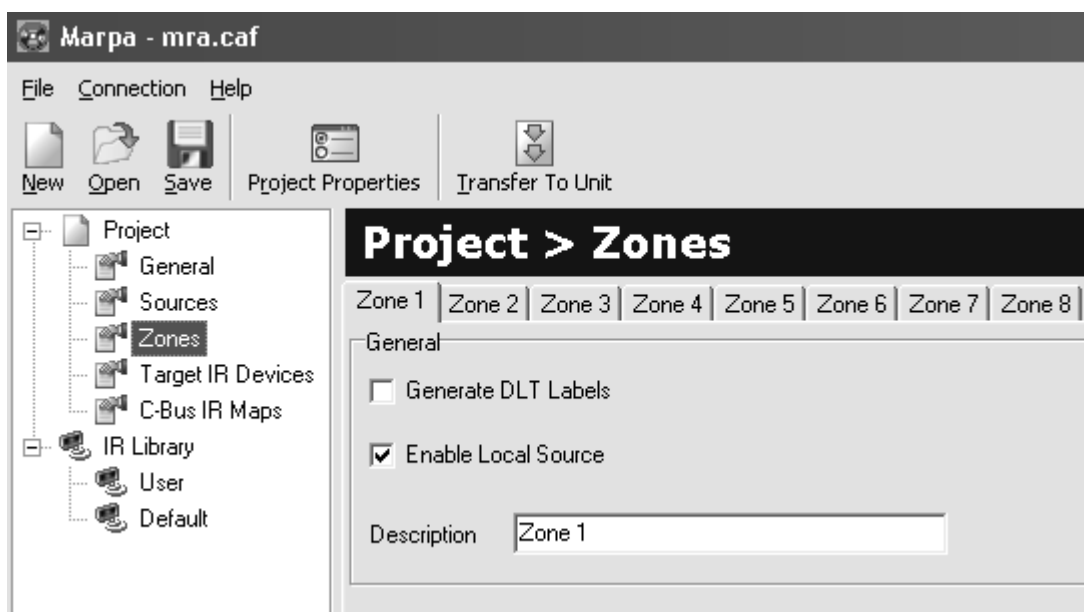

Figure 22

Generate DLT Labels

If this option is selected the description assigned to the zone will be displayed on the front of the Matrix Switcher.

Enable Local source

If this option is selected the Local source will be selectable on the amplifier for that zone and will also appear in the next and previous navigation for the particular zone.

Description

A Description for the Zone can be entered, for example Kitchen.

Every zone can have it own description.

9.0 Transfer to unit

Once the programming has been completed the project needs to be transferred to the Matrix switcher.

The matrix switcher has a USB connection at the back for downloading. A USB cable is supplied with the Matrix Switcher. Do not lengthen this cable otherwise communication may fail.

When the Matrix Switcher is plugged into the computer it will automatically load the drivers to communicate with your computer. Once the drivers are installed the computer will assign the matrix Switcher its own COM port.

When you are ready to transfer select the transfer to unit button.

The transfer to unit box will then appear as per Figure 23.
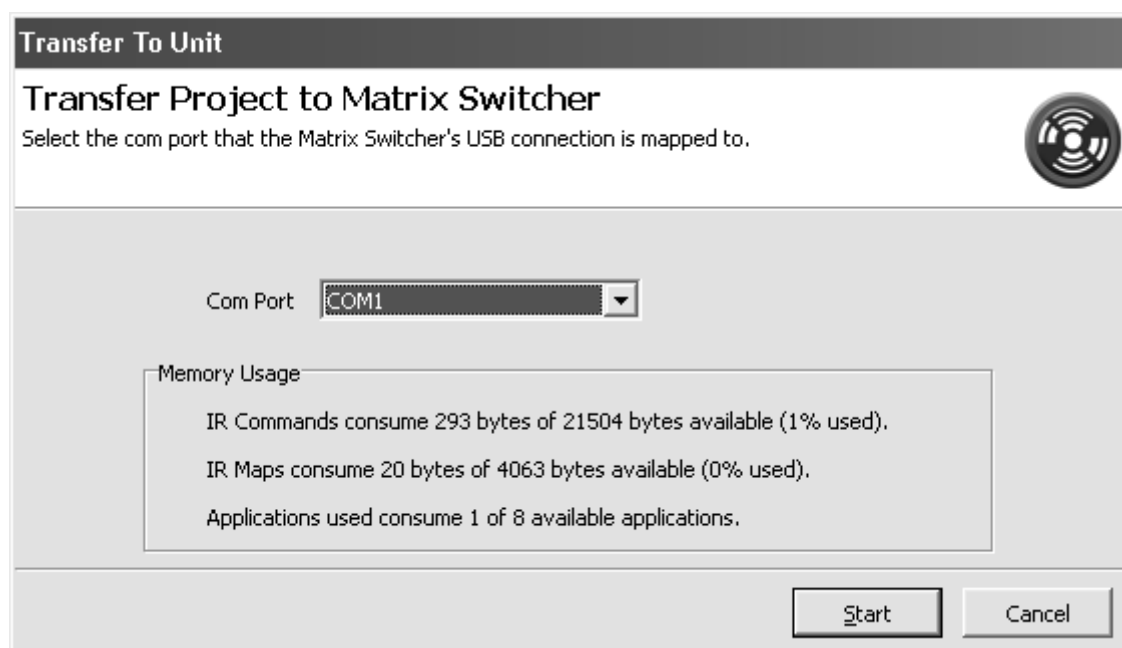
Figure 23

Memory Usage

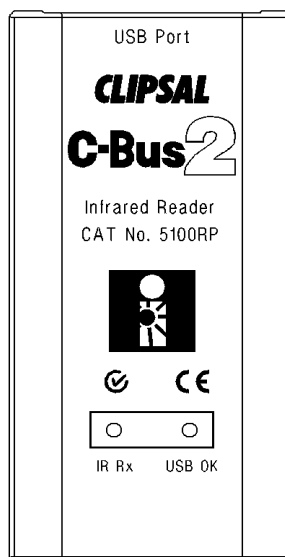The software will display how much memory has been used for the project

Select the correct COM port for the Matrix Switcher and then select start.

The software will then download and you are ready to use the Multi Room Audio system.

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Intermediate 3 C-Bus Training Course

Infrared Reader

USB Port

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C-Bus2
Infrared Reader
CAT No. 5100RP

IR Rx   USB OK

Course Code: ICB003

Revision Number: V1.0

Contents

Scope

This manual aims to provide an installer with the basic skills needed to program and use the C-Bus Infrared Reader and software. A fundamental technical background is required.

The manual includes:
- Infrared Software installation
- Hardware Installation
- Learning infrared codes.

It is an ideal preparation before attending the C-Bus Basic Training Course.

To get the most out of this manual, be sure to:
- read all chapters
- perform all exercises
- answer all questions.

Learning Outcomes

By the end of this module, you should competent in:

- installing the Infrared Reader Software
- using the Infrared Reader Software.

Assessment

This manual is to be used as a workbook. It has a number of questions and tasks at the end of each chapter, which highlight the learning objectives. At the rear of the manual there is an answer section for all the questions in the manual.

1.0   Introduction

1.1   Product Range

The C-Bus Infrared Reader (5100RP) is an accessory to the:

- 5034NIRT - Infrared Transmitter Unit
- 56004 - Audio Matrix Switcher.

1.2   Product Description

The C-Bus Infrared Reader allows you to learn infrared codes from third party remote controls. It connects to the PC via the Universal Serial Bus (USB).

A specialised software application is provided for use with the Infrared Reader. The software allows you to create *.xml (Extensible Markup Language) files, that can be used with the CIRCA software to program the:

- 5034NIRT - Infrared Transmitter Unit
- 56004 - Audio Matrix Switcher.

2.0   Software Installation

To install the latest Infrared Reader software, visit the downloads page on the Clipsal Integrated Systems website. Visit this site regularly to check for updates.

2.1   Infrared Reader Installation

Once the installation process has been initialised, the screen shown in Figure 1 will appear.
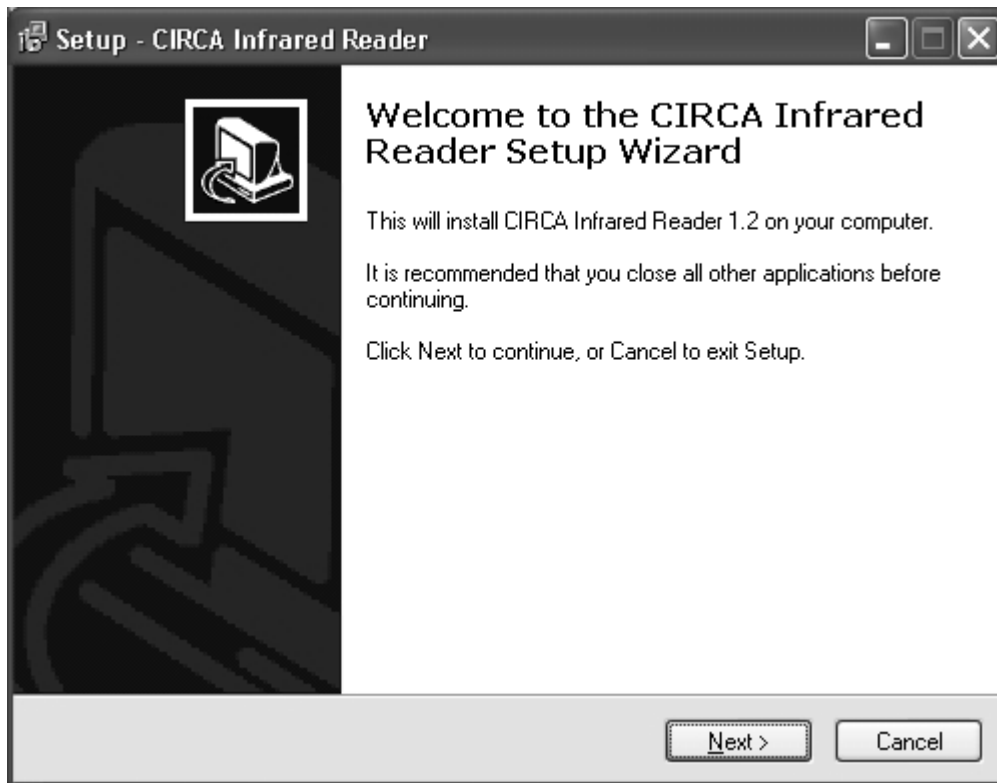

Figure 1 – Infrared Reader Installer

Click on the *Next >* button to continue the installation process. Once the installation process has been completed, the screen shown in Figure 2 will appear.

Figure 2 – Software Installation Completed

3.0 Infrared Reader Software

To run the Infrared Reader software click on the Windows *Start* button and navigate to the Clipsal folder. Inside the Clipsal folder there will be another folder called IR Reader, which contains the executable file to run the Infrared Reader Software.

3.1   Software Configuration

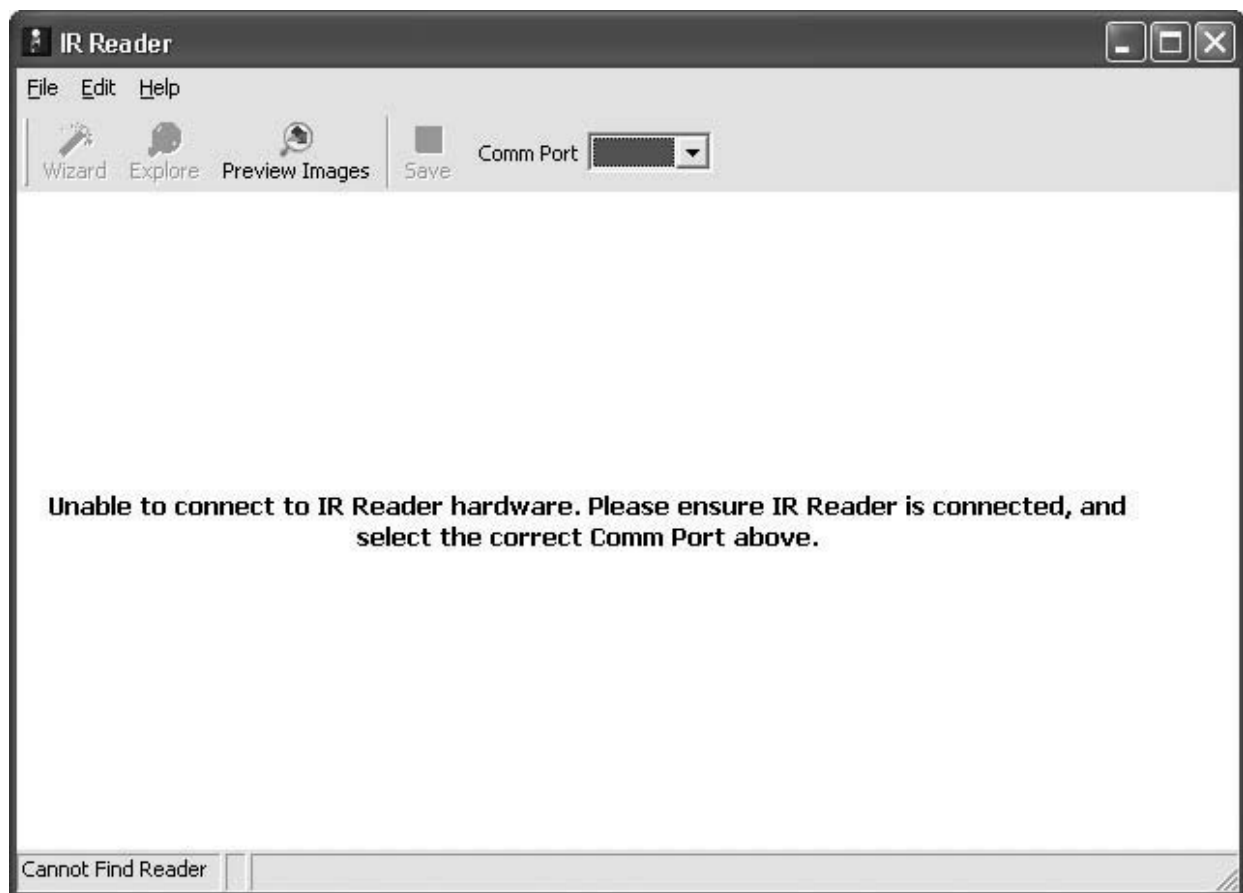Once the Infrared Software is running, the screen shown in Figure 3 will appear.

Figure 3 – The Infrared Reader Software

Connect the supplied USB cable supplied to the PC and Infrared Reader. Once the Infrared Reader has been successfully installed, the *USB OK* LED on the device will illuminate.

To connect the Infrared Reader software, navigate to the *Comm Port* Drop down menu and select the appropriate USB COM Port (check the Windows Device Manager). If the software has connected to the hardware successfully, the screen in Figure 4 will appear.
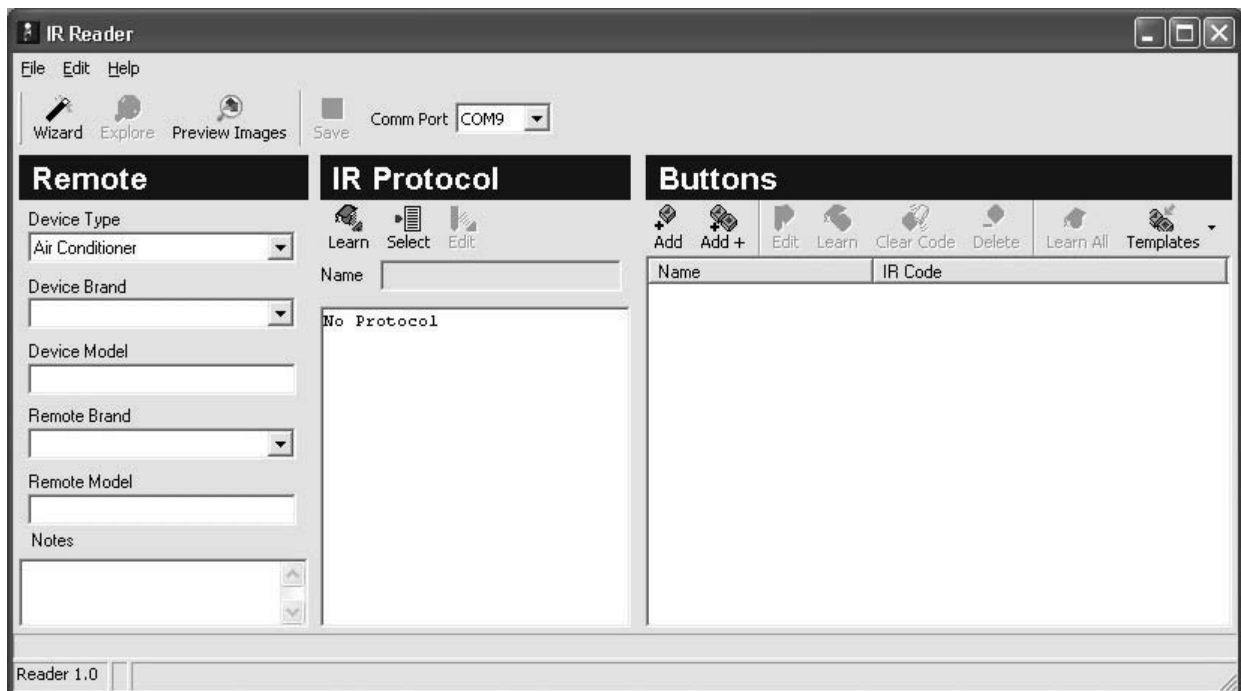

Figure 4 – Successful connection to the Infrared Reader software

3.2   IR Reader Wizard

To begin programming, click on the *Wizard* button. The Wizard in Figure 5 will appear.

Figure 5 – Infrared Reader Wizard

Remote Details

The Remote Details page of the wizard provides a series of options to input information regarding the remote control and the device it controls.

Figure 6 – Remote Details Screen

There are various parameters on the Remote Details page that you need to define. These parameters and their description are outlined in Table 1. This data will be added to the infrared library which contains all the infrared codes for the remote that is being learnt.

Device Type	The kind of unit to be controlled e.g. TV, VCR, DVD etc.
Device Brand	The brand of the unit to be controlled.
Device Model	The model of the unit to be controlled.
Remote Brand	The brand of the remote control.
Remote Model	The model of the remote control.
Notes	Any other notes that may be useful in providing information about the device or remote control.

Table 1 – Remote Details Parameters

Getting The Protocol

The "Getting the Protocol" page in Figure 7, allows you to:

- learn Infrared Commands
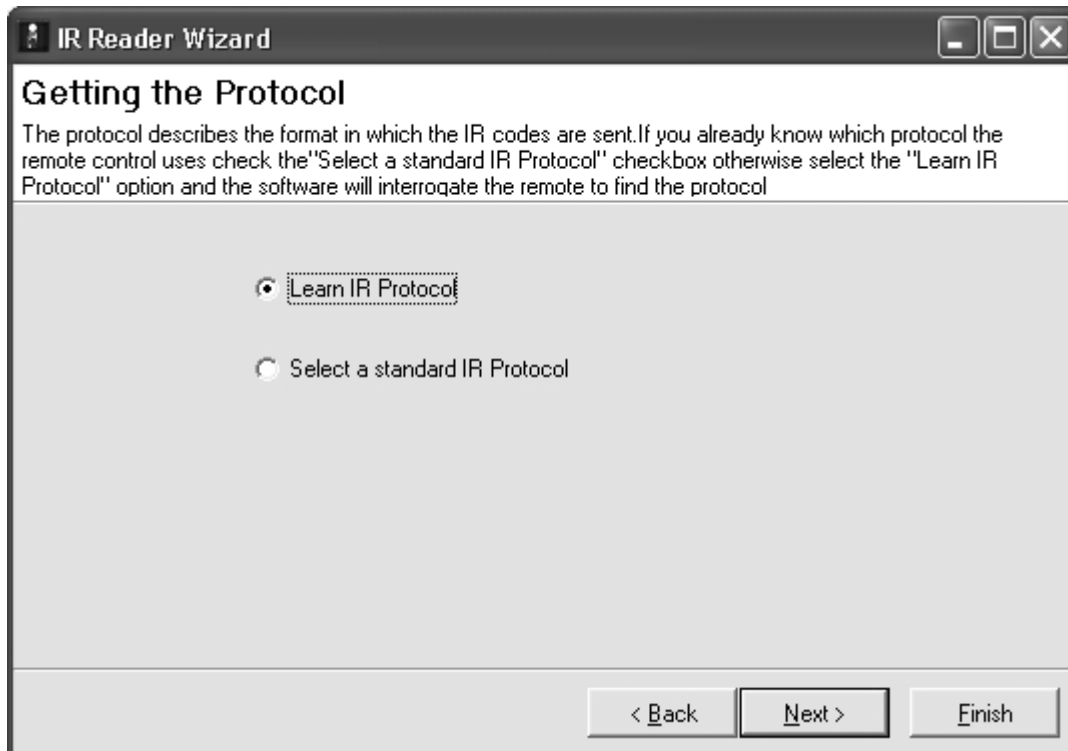- select a specific Infrared Protocol.

Figure 7 – Getting the protocol

There are two parameters in the "Getting the Protocol" page. These parameters and their description are outlined in Table 2.

Learn IR Protocol	Allows you to determine if the remote control you are learning is already know about by the software. If the remote control is not known, then the infrared codes can be learnt.
Select a standard IR Protocol	Allows you to define a known infrared protocol.

Table 2 – Getting the protocol descriptions.

Learn Remote Control Protocol

To learn a remote control protocol, there is a five step process that needs to be followed.

Table 3 displays the process that needs to be followed.

Step 1	Click on the learn button in the Learn Remote Control Protocol page. The IR Rx LED on the Infrared Reader will illuminate.
Step 2	Point the infrared window on the remote control at the target of the Infrared Reader, and follow the prompt for the next learn command.
Step 3	Press any button of the remote control for 2 seconds and follow the prompt for the next learn command.
Step 4	Press the same button as step 3 again for 2 seconds and follow the prompt for the next learn command.
Step 5	Press any other button on the remote control.

Table 3 – Learning infrared protocol process

If the infrared commands received are a recognised protocol, then the software will automatically retrieve the protocol name, and place it in the Protocol Name field. If the infrared commands are unknown, then you must enter the protocol name manually. This is usually the brand of the remote control.

If the learn process is successful a screen similar to Figure 8 will appear.
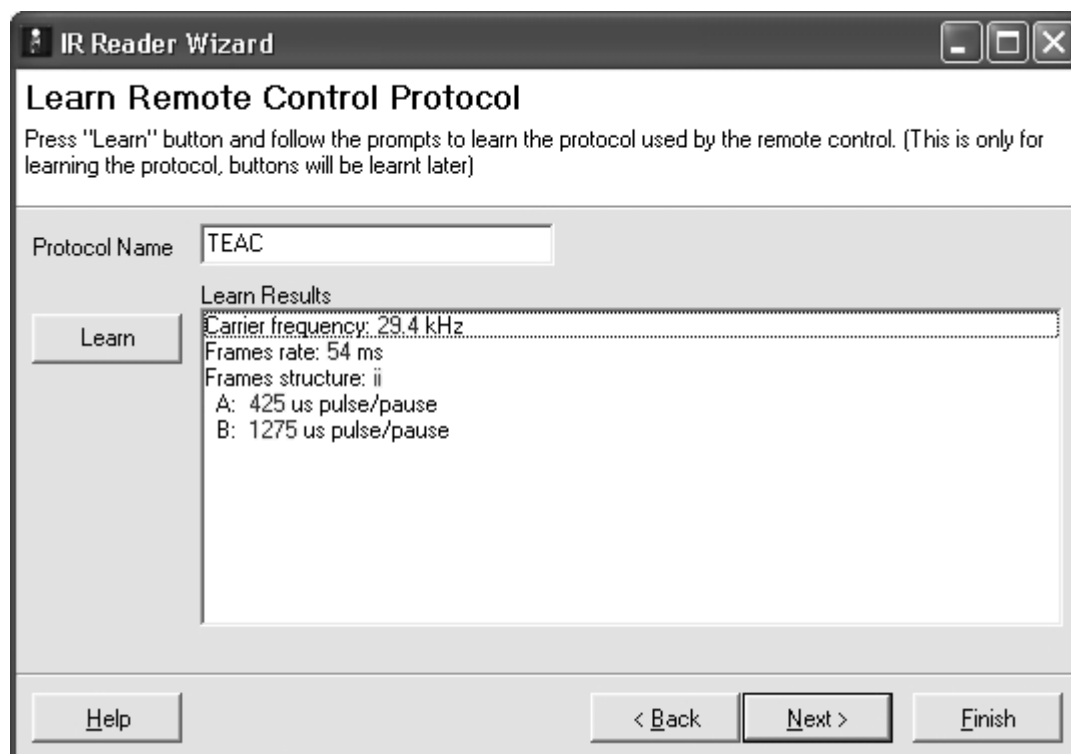

Figure 8 – A successfully learned protocol

To select a standard protocol from the wizard, you must follow most of the steps listed in the wizard. The difference is that an infrared protocol can be selected rather than learning it.
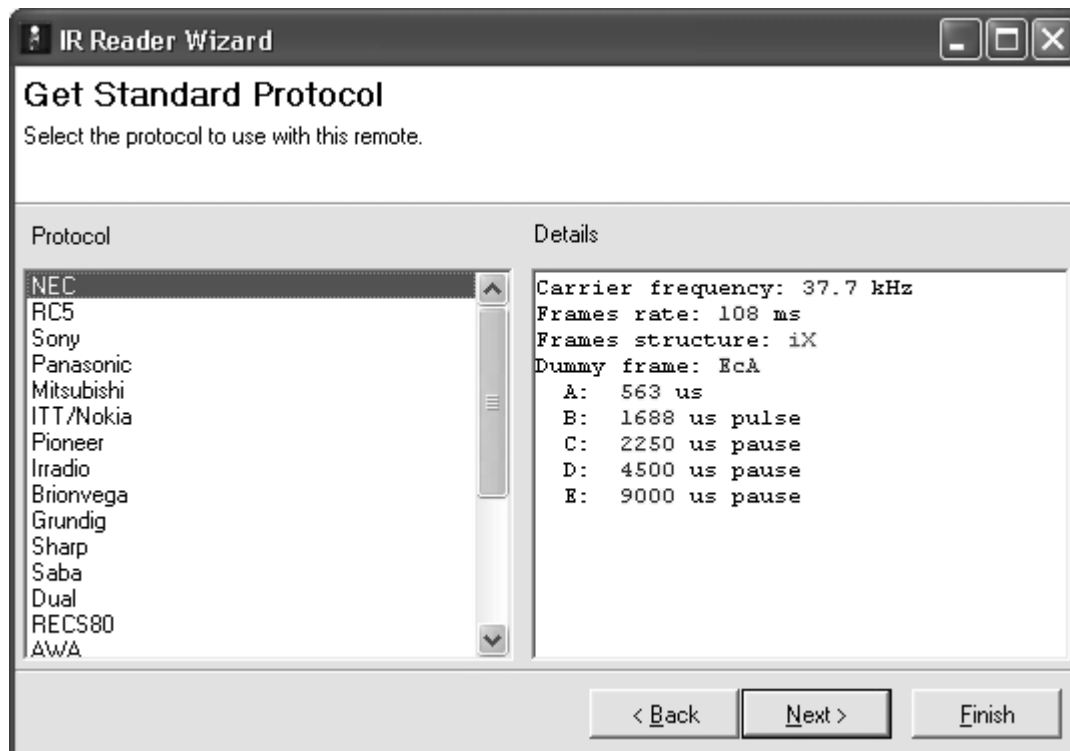

Figure 9 – A list of selectable known protocols

<u>Get Button Template</u>

The Get Button Template page of the wizard allows you to add, remove and edit remote control buttons.. This allows a custom template to be created for the specific remote control. Figure 9 displays a custom template that caters exactly for the remote being learned.

☞
NOTE   On occasions it may be easier to delete all the buttons in the default template and start from the beginning, making sure no remote control buttons are missed.
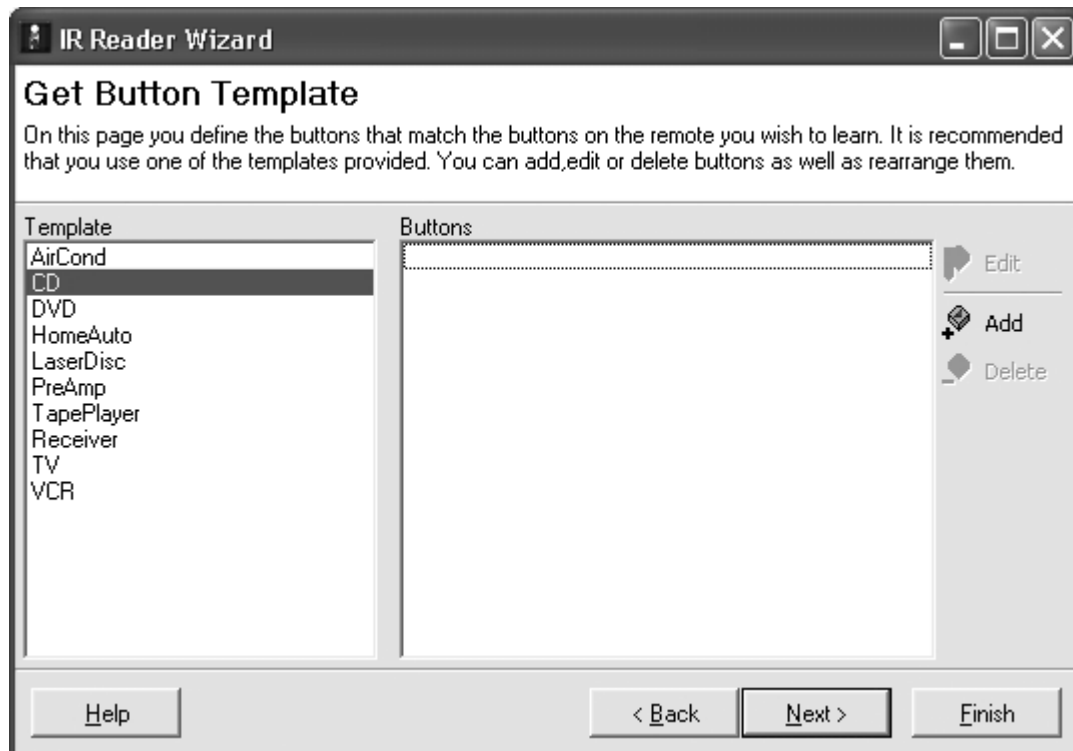

Figure 10 – Create template for remote control

To learn an infrared command from another remote control follow the five step procedure listed in Table 4.

Step 1	Click on the Add icon on the Get Button Template page.
Step 2	The window in Figure 11 will appear. Enter the name of the remote control button you are learning into the Name field.
Step 3	Point the infrared port of the remote control at the target of the Infrared Reader.
Step 4	Press the Learn button in Figure 11, and press the button on the remote control that you want the Infrared Reader to learn.
Step 5	Press the save button and the learnt infrared command will be added to the template.

Table 4 – Learning infrared commands

Figure 11 – Allows labelling the button and learning the infrared code

Once the infrared command has been learnt and saved, it will be stored in a list for the remote control template, as displayed in Figure 11.

Figure 12 – An infrared code that has been successfully learned.

👉 Another option would be to enter the button names only (and not learn the infrared
NOTE codes) in the Edit Button screen in figure 10. This will allow you to learn the command at a later stage as shown in Figure 12.

Learn Buttons

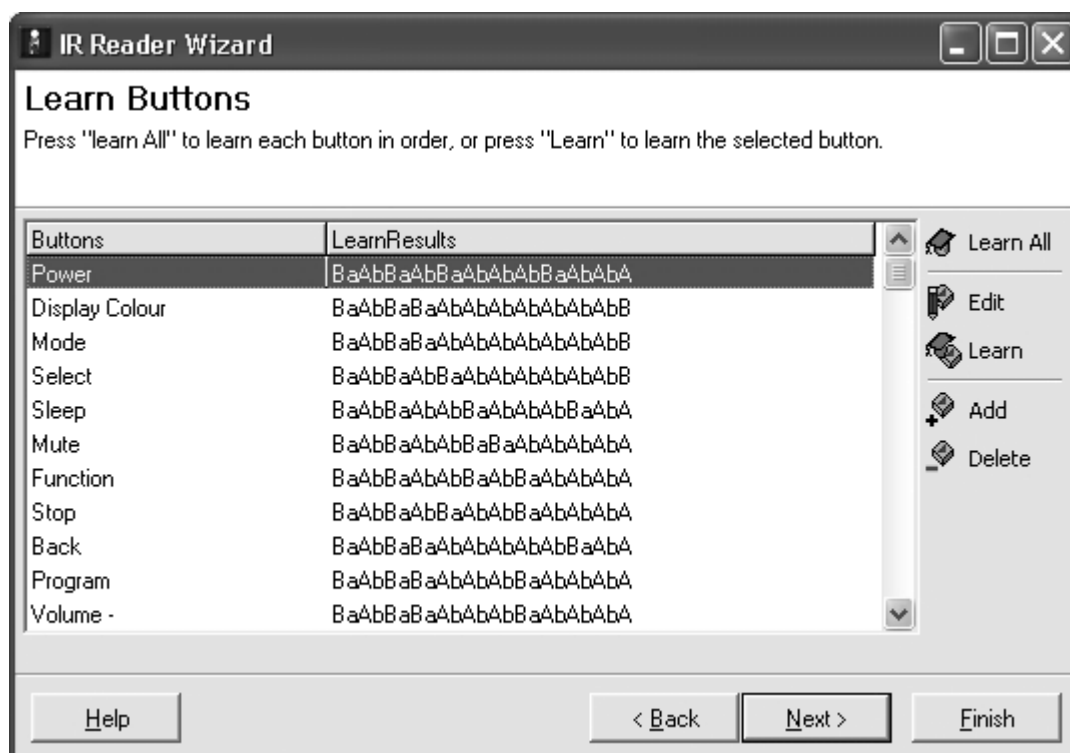Figure 12 shows the wizard once all of the commands have been learned for the specific remote control.

Figure 13 – A list of learnt infrared codes to the created template

The learn buttons page of the wizard is another method of learning infrared commands to the selected button used in the defined button template. Table 5 displays the available options for learning infrared codes.

Learn All	Will sequentially go through all the buttons in the template and learn all the corresponding commands.
Edit	Allows the user to change the name of the selected button and learn the infrared code.
Learn	Allows the user to learn the infrared code of the selected button.
Add	Allows the user to add a new button to the template and learn the corresponding infrared code.
Delete	Allows the user to delete a button from the template.

Table 5 – Options for learning infrared codes

Save To File

The final page of the wizard allows you to save the learnt infrared codes to an *.xml file.
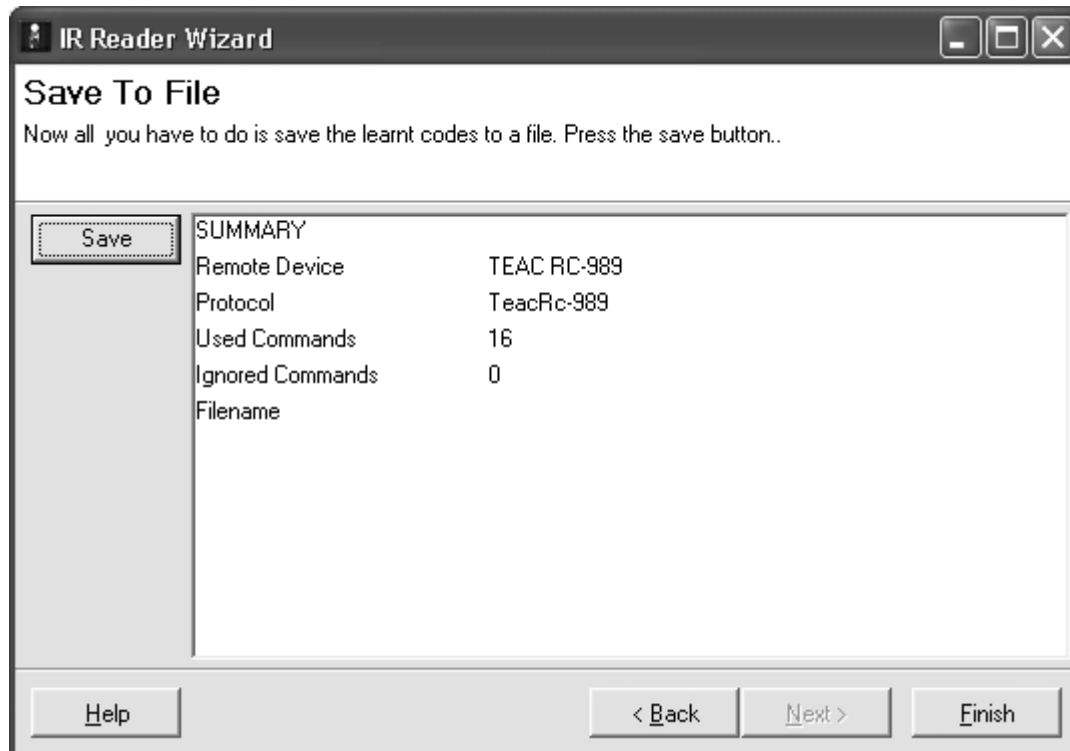

Figure 14 – Saving the infrared codes

3.3 Saving the Infrared Commands

Once the codes have been learned, the infrared information will be displayed in the main view of the software as shown in Figure 15.
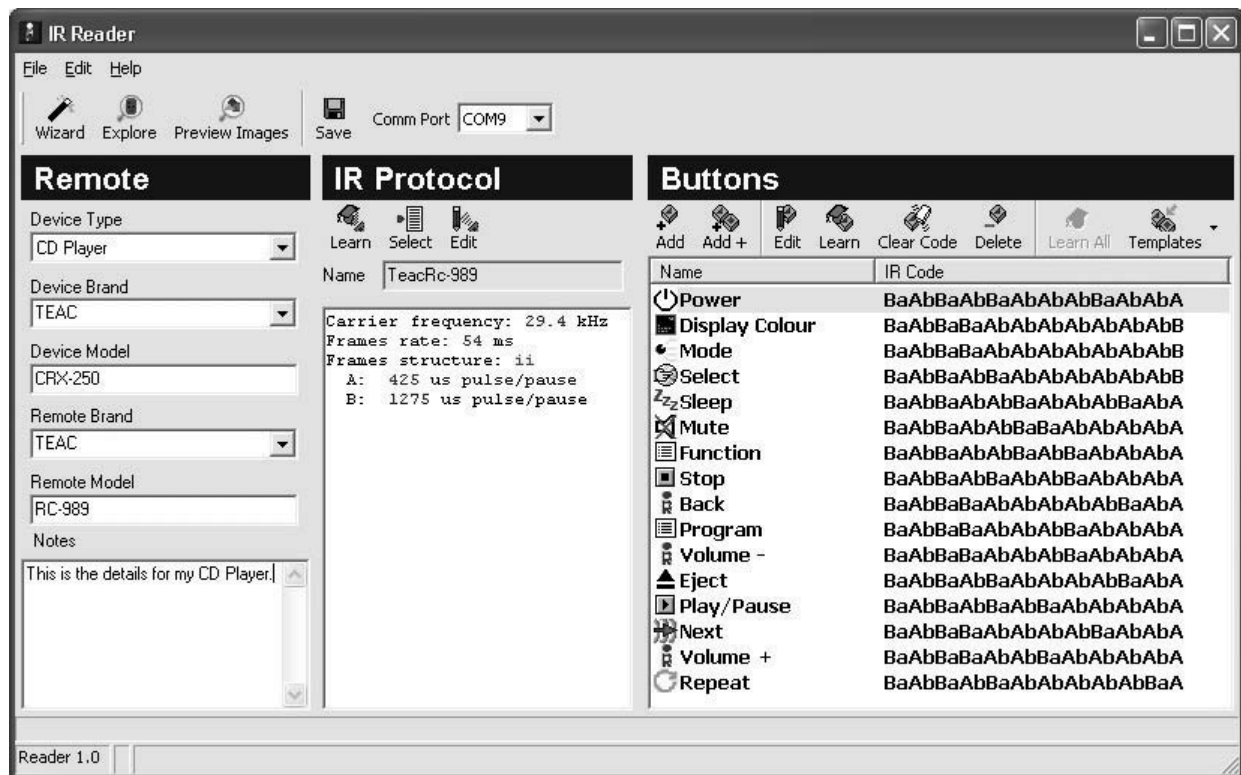

Figure 15 – Completed main screen view

If you have not completed the steps in section 3.2.6, then perform the following steps. The infrared codes are now ready to be saved in an infrared library. To do this, click on the Save button on the toolbar and Figure 16 will appear. Give the infrared codes a name in the File Name field and click the save button.
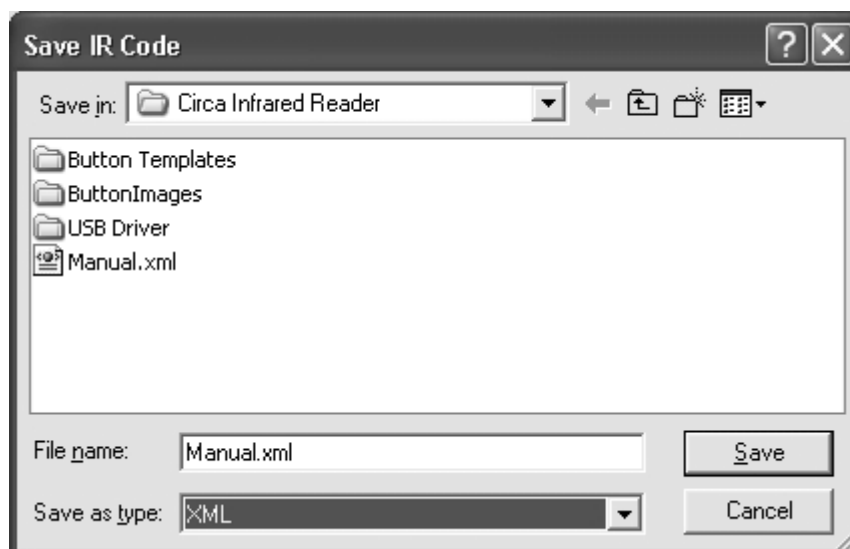

Figure 16 – Saving the infrared codes.

The infrared learn process is now complete.

SUPPORT AND SERVICE

Contact the Customer Information Center for technical support by phone at 1-888-778-2733 or e-mail at lightingcontrol.support@us.schneider-electric.com.

You may also find helpful information on our web site at www.Schneider-Electric.us.

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